EFFECTIVENESS OF FENUGREEK POWDER ON REDUCING BLOOD GLUCOSE LEVEL AMONG PATIENTS WITH TYPE II DIABETES MELLITUS AT A SELECTED HOSPITAL, MADURAI, TAMILNADU

A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

APRIL – 2012

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By

Miss. L. SARITHA

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APRIL – 2012

MATHA COLLEGE OF NURSING

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CERTIFICATE

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APRIL –2012

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APRIL – 2012

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ACKNOWLEDGEMENT

The satisfaction and pleasure that accompany a successful completion of any task would be incomplete without mentioning those people who made it possible to achieve them. I would like to express my deep sense of appreciation and gratitude to the following **experts and helping hands.**

Great and mighty is the **Lord, Our God** to whom all thanks and praise are due for all wisdom, knowledge and strength rendered and for showering upon me his loving mercies, kindness, blessings and abundant grace which strengthen me in each and every step throughout this research and my life.

I am extremely grateful to **Mr. P.Jeyakumar MA., BL** founder, chairman and correspondent**, Mrs.Jeyapackiyam Jeyakumar MA**, Bursar, Matha Memorial Educational Trust, Manamadurai for their valuable support and for providing the required facilities for the successful completion of this study.

It is my privilege to express my sincere gratitude to **Prof.Mrs.Jebamani Augustine M.Sc (N),R.N.R.M,** Dean, Matha College of Nursing, Manamadurai for her, valuable suggestions and blessings for completing this study.

It is sense of honour and pride for me to place on record, my respectful thanks to **Prof. Mrs. Shabera Banu M.Sc (N), (Ph.D.)**, Principal and HOD of Obstetrical and Gynaecological Nursing, Matha college of Nursing, for being an ever continuing and never ending source of inspiration in all my professional activities and especially in the present research investigation.

I am immensely indebted to express my sincere gratitude and honour to **Prof. Mrs. Kalaiguruselvi M.Sc (N)**, (**Ph.D.)** Vice-principal, HOD of Pediatric Nursing for sound encouragement, strong support and useful suggestions which were very valuable for the successful completion of this study.

I wish to show my gratitude to **Prof. ThamaraiSelvi M.Sc. (N), (Ph.D.),** Additional Vice- Principal, Matha College of Nursing, Manamadurai for her valuable suggestions, untiring guidance and elegant motivation throughout the study.

I was fortunate enough to have **Prof. Mrs. Jasline, M.Sc. (N), (Ph.D.),** Professor in Medical Surgical Nursing, as my guide and begin my research life. She is a perennial spring of innovative ideas. From the beginning to the end of the study she had always been there on any day and anytime and helped me in overcoming all difficulties. I owe to express my sincere gratitude for her valuable suggestions, untiring and patient corrections without which this dissertation would not have the present form and shape.

I must record my grateful thanks to **Dr. K. Sunder M.S., Surgeon**, **Managing Director** and **Dr. K. Indu Meena M.D (O&G), Medical Director** of **Karunai Multi Speciality Hospital** for their kind permission and guidance throughout my study. I owe my sincere thanks to **Mr.D.Samuel, R.N., Nursing Superintendent,** and all the hospital staffs.

I am immensely debted to express my gratitude to **Mrs.Priscilla, M.Sc. (N), (Ph.D.), Reader,** for her instructive suggestions, through which I have finished this project in a successful manner. She is sagacious and always gives wholesome ideas. I owe to her sincere gratitude for her precious advice, inspiration,

encouragement and constant guidance during each and every step of this study.

I deem it a great privilege to express my sincere thanks to **Mrs. Ponnugangeshwari M.Sc. (N),** Lecturer in Medical Surgical Nursing for her great concern, highly instructive suggestions and timely help to complete this study.

It is my privilege to take this opportunity to express my sincere thanks to **Mrs.VijayaPriya M.Sc. (N),** Lecturer in Medical Surgical Nursing for her elegant direction and motivating guidance for completing this study.

I am immensely thankful to **Mrs. Dhanapackiyam, M.Sc. (N),** and **Mrs.Visalatchi, M.Sc. (N),** Lecturers in Medical Surgical Nursing for their timely help, valuable suggestions and guidance for successful completion of this study.

I acknowledge the commendable and meticulous effort of **Dr.Duraisamy, M.Phil, Ph.D** (Bio-Statistics) for giving necessary guidance for statistical analysis, who allotted time for me whenever I needed his guidance in spite of his busy schedule.

I wish to express my sincere thanks to **Prof.S.Gnanaraj M.A., M.Phil.,** who scrutinized this study and gave his valuable suggestions regarding the language.

I extend my sincere thanks to the **Panel of Judges** in the dissertation committee and all my respectful **Professors, Associate Professors and Lecturers** of Matha College of Nursing for their valuable suggestions and guidance during the proposal and throughout the study.

My special thanks to all the **Librarian and Library Staffs** of Matha College of Nursing, Manamadurai, and TN Dr. M.G.R Medical University, Chennai, for extending library facility throughout the study.

Mere words cannot express my heartfelt gratitude to my precious and valuable parents **Mr.P.Lakshmanan and Mrs.Kousalya Lakshmanan** From the moment I was born, till date, they were always there for me to guide me and care for me at any time. I have no words to express the spirit behind my progress, cherish love and warmth showered on me by my parents. A word of thanks and gratitude is not sufficient. So I am much delighted and proud to dedicate this study to **my parents**, who have devoted their life for me and without them I cannot come to this status in my life.

I owe a lot of thanks to my affectionate brother **Mr.L.Gunalan, Senior Analyst, Utopia INC,** who supported me from the day one and encouraged me to finish this study in a successful manner. He is the world of motivation for me from my childhood and who supported financially to complete this study. I express my gratitude to my loving sister **Miss.L.Hemalatha MBA,** who stood by me at all times of need like a pedastal and helped me in doing innovative actions in the achievement of my goal.

With immense pleasure I would like to single out my lovable fiance **Mr. Gunasekaran, B.E, MBA** for his immense support, courageous words and boundless help. It is very essential to mention his wisdom and helping nature without whom this would have been a dream for me.

Friends are very special. I was fortunate to have the company of **Miss.SathiyaKala M.Sc (N),** Lecturer in Community Health Nursing and my school friend **Miss. Soundarya,** who supported me whenever I was about to fall. I offer a happiest thanks to them.

This study would not have been possible without the encouragement and co-operation of my batch mates and my friend **Ms. Nancy A**. I offer a special thanks to all of them.

Last but not the least I am indebted to my **SUBJECTS** who despite their innumerable sufferings, have whole heartedly participated and co-operated with me in this research; without them this research might not be a possible.

I am at a loss if I have neglected to thank anyone who in the course of this study has helped me. I am grateful to all those helping hands and not mentioning their name is purely unintentional. I offer a Bouquet of gratitude to all of them.

ABSTRACT

INTRODUCTION

Diabetes mellitus is one of the chronic medical illnesses. It is a silent disease in which the pancreas no longer produces enough insulin or cells stop responding to the insulin that is produced. It is now recognized as one of the fastest growing threats and economic burden to the public health in almost all countries of the world.

Many pharmacological measures were introduced to control diabetes mellitus. However less attention has been given to the natural therapies to control diabetes mellitus. Fenugreek is one of the interventions found to reduce the blood glucose level among patients with type II diabetes mellitus. Hence the investigator ended in reducing the economic burden of the disease by selecting a non-pharmacological method, for reducing the level of blood glucose.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of fenugreek powder on reducing blood glucose level among patients with Type II diabetes mellitus in a selected hospital at Madurai.

METHODOLOGY

Quantitative research approach was used in this study. The research design adopted for this study was quasi-experimental design. The study was conducted in Karunai Multi Specialty Hospital, Madurai. Purposive sampling technique was used for sample selection. The sample size was 60 clients with type II diabetes mellitus who fulfilled the inclusion criteria.

OBJECTIVES

1. To assess the pre-test level of blood glucose among patients with Type II diabetes mellitus of experimental group and control group.
2. To assess the post-test level of blood glucose among patients with Type II diabetes mellitus of experimental group and control group.
3. To find out the effectiveness of fenugreek powder in reducing the blood glucose level among patients with Type II diabetes mellitus in the experimental group.
4. To associate the post-test level of blood glucose and selected demographic variables in the experimental group.
5. To associate the post-test level of blood glucose and selected demographic variables in the control group.

HYPOTHESES

1. There will be a significant difference between post-test level of blood glucose in experimental group and control group.
2. Mean post-test level of blood glucose will be lower than mean pre-test level of blood glucose in experimental group.
3. There will be a significant association between post-test level of blood glucose among patients with type II diabetes mellitus and selected demographic variables in experimental group.
4. There will be a significant association between post-test level of blood glucose among patients with type II diabetes mellitus and selected demographic variables in control group.

MAJOR FINDINGS OF THE STUDY

- With regard to age 30% were between 41-50 and 51-60 years in experimental group and 36.7% were between 41-59 years of age in control group.
- With regard to sex, in the experimental group 56.7% were males and 66.7% were males in the control group.
- Regarding the religion, majority of the subjects i.e., 36.7% were Muslims in experimental group and 50% were Hindus in control group.
- Regarding the marital status, majority of the samples, 76.7% were married in both experimental and control groups.
- Regarding the educational status, majority of the subjects had completed higher secondary education, 26.7% in experimental group and 23.3% of subjects in control group.
- Regarding the occupation, majority of the samples, 33.3% were unemployed in experimental group and 23.3% were coolies, government and private employees in control group.
- Regarding the family income, majority of samples, 33.3% were getting between Rs. 4001 and Rs.6000 in experimental group and 40% of samples were getting above Rs. 6000 in control group.
- With regard to family history of diabetes mellitus, majority of the sample's parents were having the history of diabetes, i.e., 40% in experimental group and 43.3% in control group.
- Regarding personal habits, 40% of samples were having none in experimental group and 40% were alcoholic in control group.

- Regarding the diet, majority of the subjects were taking mixed diet in experimental group (60%) and in control group (56.7%).
- Regarding the duration of treatment taken for diabetes mellitus, majority of them were between 4 and 6 years in experimental (50%) in and control group (40%).
- With regard to following diabetic diet, 53.3% of samples said ‘no’ in the experimental group whereas 50% said ‘no’ in the control group.
- Regarding the habit of doing exercises, 53.3% of samples said ‘yes’ in experimental group and 80% of samples said ‘no’ in the control group.
- The mean post-test level of blood glucose (146.66) was lower than the mean pre- test level of blood glucose (220.60) in experimental group.
- There was an association between post-test blood glucose level of experimental group and their selected demographic variables such as religion, following diabetic diet and habit of doing exercises. In control group there was an association between post-test blood glucose level and their selected demographic variables such as religion, marital status, following diabetic diet and habit of doing exercises.

RECOMMENDATIONS

- The study can be conducted by using large populations to generalize the findings.
- A longitudinal study can be conducted to assess the effectiveness of fenugreek in maintaining the blood glucose level.
- This study can be done as a comparative study in different settings.

- The effectiveness of fenugreek can be tested among patients with diabetes mellitus who are on insulin administration.
- A follow up study can be done to find out whether the patients are practicing fenugreek intake regularly.

CONCLUSION

Diabetes mellitus is a common chronic disease requiring lifelong behavioral and lifestyle changes. It should be managed with a team approach to empower the client to successfully manage the disease. The nurse should plan, organize, and co-ordinate the care among the various health disciplines involved. Fenugreek had proved its effect on reduction of blood glucose level among patients with type II diabetes mellitus. Proper education about this should be given to the patients to promote their health and well-being.

CHAPTER – I

INTRODUCTION

"Health is the resource for everyday life
Not the object of living"

-Anonymous

Diabetes mellitus is a nutritional disorder characterized by a lack of insulin hormone in the blood, which leads to abnormalities in the assimilation of carbohydrate by the body. Every fifth person who suffers from diabetes in the world is an Indian. Diabetes mellitus [Diabetes=flow through, Mel=honey] is a chronic metabolic disorder with a strong hereditary basis.

The World Health Organization has passed the alarm bell for guarding against diabetes mellitus. In the Asian region there are some attributing factors like genetic make-up, diet and sedentary life style that increase the national risk of Asians.

According to **Smelter and Bare (2004)** the major classifications of diabetes are:

- Type I: Insulin Dependent Diabetes Mellitus [1DDM]
- Type II: Non-Insulin Dependent Diabetes Mellitus [N1DDM]
- Diabetes mellitus associated with other conditions/ syndromes
- Gestational diabetes Mellitus [GDM]

Type II diabetes, formerly known as adult onset or Non-insulin dependent diabetes mellitus, is the most common form of diabetes.

This form of diabetes usually begins with insulin resistance, a condition in which muscle and liver cells do not use insulin properly. Being overweight and inactive, increase the risk of developing Type II diabetes **(Shanti Johnson & Leah Mecaden, 2006)**.

The clinical manifestations of diabetes include the three 'P's', polyuria, polydipsia and polyphagia, other symptoms include fatigue and weakness, sudden vision changes, tangling a numbness in the hands or feet, dry skin, sores that are slow to heal and recurrent injections **(Smeltzer & Bare, 2004).**

The management of diabetes mellitus is primarily aimed at achieving a balance of diet, activity and medications together with appropriate monitoring and patient family education. These components are equally necessary for effective control of diabetes **(Lewis Heitkem & Dirkson, 2004).**

Diabetes can lead to decreased quality of life, increase in mortality and acute metabolic complications. Hyperlipidemia, hypertension, peripheral vascular disease, blindness, nephropathy and neuropathy are some of the potential consequences of living with diabetes **(Hans, 1993; Munning & Marthi, 1998; Hendricks, 1998; Helman, 1991** as cited by **Shanthi Johnson & Leah Macaden, 2006).**

The diabetes education is often grouped into three main topic areas; survival, home care and improved lifestyle. Changes in life style occur gradually over time and are dependent on the client's interest, willingness, and ability to make these changes. The health care team works together to develop an individualized plan of care **(Joyce M. Black, 2005).**

Exercise therapy, yoga and games play a major role in the control of diabetes with adjustment of diet. Selection of exercise therapy and yoga for each diabetes patient after proper screening and education is mandatory with the type of exercise protocol advocated under medical supervision **(Shekar Shan, 1999).**

Many measures were taken to control and prevent diabetes mellitus. One of the current measures is the intake of fenugreek seeds daily to diminish hyperglycaemia in diabetes mellitus patient.

Fenugreek seeds (Hindi name: Methi, Dana Methi) are hard and yellowish brown. It grows wild in India, the Mediterranean and North Africa. Ancient Egyptians have grown it as cattle fodder and used it to treat fever. The powder has a strong aromatic flavour and bittersweet taste. The fenugreek seeds are diuretic, carminative, lactagogue and astringent.

Fenugreek is used as a spice and as a yellow dyestuff in India. It is also used in many medical conditions such as diabetes mellitus, hyperlipidemia and hypertension.

The medical uses of fenugreek are more. Fenugreek leaves and seeds help in blood formation. They are good for preventing anaemia and rundown conditions. Fenugreek seed intake in lactating mothers increases the flow of milk. The other uses are, a paste of the fresh fenugreek leaves, applied on the face prevents pimples, blackheads, dryness of the face and early appearance of wrinkles and adding half a teaspoon of fenugreek seeds to the lentil and rice mixture while soaking will make dosas crisper.

Fenugreek seed contains 50.2 percent fibre and consists of 17.7 percent gum, 22 percent hemicelluloses, 8.3 percent cellulose and 2.2 percent lignin **(Ribes, 1996).**

Fenugreek improves tissue sensitivity to insulin thereby enhancing peripheral utilization of glucose. Fenugreek is also known to lower the counter-insulin hormones glucagon and somatostatin and is a metabolic modulator regulating lipid metabolism and preventing release of Non-Esterified fatty Acids (NEFA) and Tumour Necrosis factor (TNF) from central adipolytes. These free fatty acids decrease the hepatic muscle. Thus it attenuates factors that interfere with the action of insulin. As a result, insulin resistance is removed, blood glucose returns to normal, thus decreasing the stimulus for insulin secretion.

NEED FOR THE STUDY

Diabetes mellitus is the fourth leading cause of death on the most developed countries and typically reduces the life expectancy by 8-10 years. It is highly dreaded as an entry point to varied complications affecting almost every important body organ starting from kidney, heart, eyes, liver to feet.

Global scenario

Diabetes is one of the most common (with worldwide distribution) and most metabolic diseases that are one of the leading causes of morbidity and mortality worldwide. Practically any organ system of the body can be affected by diabetes and has become a major health problem in most of the parts of the world. Long standing, inadequately managed or untreated case of diabetes leads to complaints which causes blindness, end stage renal disease risk for

stroke, ischemic heart disease, peripheral vascular disease, peripheral neuropathy, lower extremity amputations due to involvement of foot etc.

The World Health Organization has already declared that diabetes has reached epidemic proportions, as the number of diabetes patients or prevalence has gone up dramatically over the few decades, from only 30 millions in 1985 to 135 millions in 1995, 177 millions in 2000 and more than 200 million by 2010 and World Health Organization (WHO) estimates of by current trend that by 2025 the number of diabetes patients will be more than 300 millions. The increase in the number of diabetes patients will be mainly in developing countries such as India, China and other highly populated developing counties.

Although, the prevalence of type-II diabetes is occurring much faster than type-I diabetes, may be because of increasing obesity and sedentary lifestyle (reduced activity levels) as countries become more industrialized.

According to the Centre for Disease Control and Prevention (CDC), the prevalence rate of diabetes in the United States was approximately 7 percent of the population or more than 20 million in 2005 (approximately 39 percent of individuals with diabetes do not know they have diabetes). CDC also estimated that the prevalence of diabetes among individuals below 20 years was 0.22 percent, 9.6 percent among individuals above 20 years of age and 20.9 percent among individuals above 60 years of age. The prevalence of diabetes among men and women was not significantly different.

The prevalence of type-I diabetes and type-II diabetes has considerable geographic variation. Scandinavian countries have the

highest incidence of type-I diabetes e.g. in Finland, the incidence is 35/100,000 per year and the Pacific Rim has lowest rate type-I diabetes (e.g. in Japan and China, the incidence is 1-3/100,000 per year). Northern Europe and North America have intermediate rate (8-17/100,000 per year) of type-I diabetes. Prevalence of type-II diabetes and IGT (impaired glucose tolerance, which is pre-diabetic state), is highest in certain pacific islands, intermediate in India and the United States, and low in Russia, which may be due to genetic, behavioural, and environmental factors.

The prevalence of diabetes can also vary among different ethnic populations within a given country or geographical area, e.g. in the United States according to CDC estimates in 2005, among individuals of age above 20 years, the prevalence was 13.3 percent in African Americans, 9.5 percent in Latinos, 15.1 percent in Native Americans (American Indians and Alaska natives), and 8.7 percent in non-Hispanic whites and Asian-American. Pacific-Islander ethnic groups in Hawaii have twice the risk of diabetes compared to non-Hispanic whites.

The Indian Diabetes Scenario

India already has the largest number of diabetes patients in the world and the number is only going up steadily, although in terms of total population it is second to China. Hence many experts term India as “Diabetes Capital” of the world.

According to WHO estimation, India had 32 million diabetic subjects in the year 2000 and this would increase to 80 million by the year 2030. The International Diabetes Federation (IDF) also reported that the total number of subjects in India is 41 million in 2006 and this would rise to 70 million by the year 2025.

Studies on migrant Indians have shown that they have a higher predisposition to insulin resistance, type II diabetes and coronary artery disease compared to other ethnic groups. The so called “Asian Indian Phenotype” refers to certain unique clinical and bio-chemical abnormalities in Asian Indians and this constellation of abnormalities is considered to be one of the major factors to the increased prevalence of type II diabetes in Asian Indians.

In 1970s the prevalence of diabetes was approximately 2 percent among urban populations in India, but at present the prevalence is more than 12 percent. A recent study conducted in six different cities support the prevalence rate, which shows very high prevalence in Chennai (13.5%), Bangalore (12.4), Hyderabad (16.6%), Mumbai (9.3%), Delhi (11.6) and Kolkata (11.7).

In the last two decades there is a marked increase in the prevalence of diabetes among Indians, especially in urban areas. Among rural and semi-urban areas there is increasing in prevalence of diabetes, but the increase is slower. The reason for the dramatic increase in prevalence of diabetes has been attributed to:

- Lifestyle change due to modernization and industrialization.
- Ageing of the population.
- Lower birth weight. Statistics have shown that more than 25 percent of the children born in India are of low birth weight. Low birth weight with stunting growth and muscle wasting which is followed by overweight and obesity in later life have been postulated to contribute for diabetes and the insulin resistance syndrome.

In India the prevalence of diabetes is higher among affluent class, unlike in developed countries where the prevalence is highest in low socio-economic class. The difference in prevalence among different socio-economic classes is due to difference in the stage of epidemiological transition between India (and other developing countries) and developed countries.

The Tamil Nadu diabetes scenario

Chennai is perhaps the only city in India where a series of population based studies have been done which has enabled the investigators to compare the prevalence rates. A study done in the same urban area after five years showed that the prevalence had risen to 11.6 percent. The **Chennai Urban Rural Epidemiology Study (CURES)** investigators had a unique opportunity to compare prevalence rates of diabetes in Chennai city with three earlier epidemiological studies carried out in the same city using similar methods.

The overall crude prevalence of diabetes using WHO criteria in CURES was 15.5 percent. From 1989 to 1995, the prevalence of diabetes in Chennai increased by 39.8 percent (8.3 to 11.6%); from 1995 to 2000 by 16.3 percent (11.6 to 13.5%) and from 2000 to 2004, by 6.0 percent (13.5 to 14.3%). Thus within a span of 14 years, the prevalence of diabetes increased significantly by 72.3 percent.

There are few studies from India which has located at the micro vascular complications of diabetes in a population. John et al in 1991 showed that the prevalence of microalbuminuria was 19.7 percent and diabetic retinopathy was 8.9 percent in a clinic based study from Vellore. Vijay et al reported a prevalence of 18.7 percent of proteinuria in a clinic based study from Chennai. The prevalence of

neuropathy was found to be 27.5 percent and 19.1 percent in two separate clinic based studies from Chennai.

The District Diabetes Scenario

A recent report from Madurai revealed that of the 1,863 new diabetic patients seen at a tertiary eye centre, 37 percent had overt diabetic retinopathy. However, some also had advanced cataracts in the same eyes which obscured the exact stage of retinopathy.

Karunai Multi Speciality Hospital is situated in Bibikulam, Madurai. It consists of Diabetelogy Department, ICU, Obstetrics and Gynecology Department, Casuality for Emergency and Trauma, Oncology Department, Head injury clinic, one major theatre and one minor theatre, biochemistry lab, facilities for X-ray, CT scan and ECG. Approximately 350 patients per month visit Diabetology Department for consultation and treatment. Among them 230 clients are under oral hypoglycemic agent and diet control. Apart from this, 30 out-patients visit the hospital daily for each speciality and eight to ten patients will be in the in-patient department.

The role of the nurse educator in clinical practice and in hospital teams is a new approach to improving the quality of patient education. The nurse educator has specific responsibilities in the evaluation of each diabetic patient. An assessment of not only what the individual knows about his illness and where his educational needs lie, but also of each person's readiness to learn, should also be considered. The nurse educator must be skilled in the teaching learning process and must have a good background and understanding of diabetes, including diabetes complications and problems **(JD Dudley, 2002).**

Use of a "Diabetes Coach" is becoming an increasingly popular way to manage diabetes. A Diabetes Coach is usually a Certified Diabetes Educator (CDE) who is trained to help people in all aspects of caring for their diabetes. The CDE can advise the patient on diet, medications, proper use of insulin injections and pumps, exercise, and other ways to manage diabetes while living a healthy and active lifestyle.

Nowadays a lot of advancement, modern technologies and equipments emerged in medical fields to provide optimal health for all. But still diabetes mellitus is transferring from generation to generation and affects the health status of the people. So the investigator has chosen this study to control type II diabetes mellitus by using fenugreek powder, which is a common item used in our day to day diet preparation.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of fenugreek powder on reducing blood glucose level among patients with Type II diabetes mellitus in a selected Hospital at Madurai.

OBJECTIVES

1. To assess the pre-test level of blood glucose among patients with Type II diabetes mellitus of experimental group and control group.

2. To assess the post-test level of blood glucose among patients with Type II diabetes mellitus of experimental group and control group.

3. To find out the effectiveness of fenugreek powder in reducing the blood glucose level among patients with Type II diabetes mellitus in the experimental group.

4. To associate the post-test level of blood glucose and selected demographic variables in the experimental group.

5. To associate the post-test level of blood glucose and selected demographic variables in the control group.

HYPOTHESES

1. There will be a significant difference between post-test level of blood glucose in experimental group and control group.

2. Mean post- test level of blood glucose will be lower than mean pre- test level of blood glucose in experimental group.

3. There will be a significant association between post-test level of blood glucose among patients with type II diabetes mellitus and selected demographic variables in experimental group.

4. There will be a significant association between post-test level of blood glucose among patients with type II diabetes mellitus and selected demographic variables in control group.

OPERATIONAL DEFINITIONS

Effectiveness

In this study it refers to the outcome of the intervention of the fenugreek administration in reducing the level of blood glucose among patients with type II diabetes mellitus and it is measured by bio- physiological measures (Glucometer). Normal level of fasting blood sugar level is 70-110mg/ dl.

Fenugreek powder

An old word herb (Trigonella foenum- gracecum, of the pea family), having strongly scented leaves and mucilaginous seeds. Fenugreek seeds contain the unique major free amino acid four – hydroxyl isoleusine which decreases the beta-cell secretion and increases the insulin activity and it has been characterized as one of the active ingredients for blood glucose control.

In this study fenugreek powder was prepared by grinding method by the researcher and administered it before breakfast by mixing with 200ml of water. And then the subjects were instructed to take orally for 15 days. Only the experimental group was treated with fenugreek.

Patients with Type II diabetes mellitus

Type II diabetes is defined as a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency. In this study the patient who was diagnosed as having Type II Diabetes mellitus by the physician, was included and glucometer was used to monitor the blood glucose level (more than 110mg/dl).

ASSUMPTION

- ✧ Nursing interventions based on the needs of the client will enhance their interest to practice.
- ✧ Fenugreek powder has no side effect on patients with type II diabetes mellitus.
- ✧ Fenugreek powder taken continuously (15 days) will lower the level of blood glucose.

LIMITATIONS

The study is limited to,

- ✧ Subjects with type II diabetes mellitus taking oral hypoglycemic agent.
- ✧ The data collection was limited to a period of six weeks.
- ✧ The study has been limited to the sample size of 60.

PROJECTED OUTCOME

The study will reveal that intake of fenugreek powder reduces the blood glucose level among patients with type II diabetes mellitus.

The nurse can use fenugreek as a complementary medicine in the treatment of type II diabetes mellitus, which will be a health promotion activity in the general population.

CONCEPTUAL FRAMEWORK

The present study is based on Becker M (1974) health belief model. This model was developed to provide a framework to explain why some people take specific actions to avoid illness while others fail to protect them.

The model addresses the relationship between a person's belief and behaviour. It provides a way of understanding and predicting how clients will behave in relation to their health and how they will comply with health care therapies.

This model is divided into three major components.

i. Individual perception
ii. Modifying factors
iii. Variables affecting the likelihood of imitating actions

Individual perception

View of susceptibility to disease and the seriousness of the disease combine to form his or her perceived threat of an illness. The demographic variables and pre-test level of blood glucose was assessed by using a glucometer for both the experimental and the control group samples and the levels were grouped as 70-110mg/dl, 111-150mg/dl, 151-190mg/dl, 191-230mg/dl, 231-270mg/dl and 270-310mg/dl.

Modifying factors

It includes demographic variables such as age, sex, religion, marital status, educational status, occupation, family income, family history of diabetes, personal history, diet, duration of treatment taken, following diabetic diet and habit of doing exercises.

Cues of action include intake of fenugreek powder along with an oral hypoglycaemic agent in the experimental group and intake of oral hypoglycaemic agent without fenugreek powder in the control group.

Variables affecting the likelihood of imitating actions

It is influenced by the perceived benefits of action weighed against barriers to acting such as cost, inconvenience and unpleasantness. The post-test level of blood glucose was assessed by using the glucometer.

After the post-test there was a reduction in blood glucose level among the samples in the experimental group, whereas there was no remarkable change in the level of blood glucose among samples in the control group.

CHAPTER-II

REVIEW OF LITERATURE

Review of literature is a systematic search of published work to gain information about a research topic (Polit & Hungler).

Conducting a review of literature is a challenging experience. Through the literature review, researcher generates a picture of what is known about a particular framework, to proceed with the study. A literature review provides a background for current knowledge on the topic and illuminates the significance of the new study. Review of literature orients oneself with what is not known and known about an inquiry to ascertain what research can best make content to the existing base of evidence.

The literature review is organized and presented under the following headings:

1. Studies related to type II diabetes mellitus.
2. Studies related to type II diabetes and diet.
3. Studies related to type II diabetes and exercise.
4. Studies related to the effectiveness of fenugreek on the blood glucose level in type II diabetes mellitus.

Studies Related to Type II Diabetes Mellitus

García-Martín A. et al., (2011) carried out a study to evaluate serum sclerostin in T2DM patients and to analyze its relationship with bone metabolism. They did a cross-sectional study and compared

serum sclerostin in the T2DM group (n = 74) and control group (n=50). The results showed that sclerostin levels were significantly higher in T2DM patients than control subjects (P < 0.001) and in T2DM males than in T2DM females (P < 0.001). Serum sclerostin was positively correlated with age in males T2DM (P = 0.031). Sclerostin concentrations were positively associated with duration of T2DM (P = 0.064) and glycosylated hemoglobin (P = 0.074) independently of age in T2DM patients. They were concluded that circulating sclerostin is increased in T2DM independent of gender and age. Serum sclerostin is also correlated with duration of T2DM and glycated hemoglobin.

Schunk M et al., (2011) conducted a study to estimate the population values of Health- aims Related Quality Of Life (HRQL) in subjects with and without Type II diabetes mellitus across several large population-based survey studies in Germany. The results were as subjects with Type II diabetes in comparison with subjects without Type II diabetes. Type II diabetes was associated with significantly lower mental component summary score-12 in women only. Higher age was associated with lower physical component summary score-12, but with an increase in Pooled mental component summary score-12, for subjects with and without Type II diabetes mellitus. They have concluded that analysis of population-based primary data offers HRQL values for subjects with Type II diabetes in Germany, stratified by age and sex. Type II diabetes has negative consequences for HRQL, particularly for women.

Winter Y et al., (2011) investigated about the relation of genetic markers to obesity genes FTO and MC4R and the gene of type II diabetes mellitus TCF7L2 for their contribution to risk of stroke and Transient Ischemic Attacks (TIA). They recruited 379

consecutive patients with stroke/TIA and 379 healthy population-based controls. The results showed that the odds ratios for stroke/TIA were 1.14 (95%CI 0.91-1.42) for rs9937053/FTO, 1.11 (95%CI 0.49-2.51) for rs2229616/MC4R, 1.05 (95%CI 0.82-1.3) for rs17782313/MC4R, and 0.99 (95%CI 0.78-1.25) for rs7903146/TCF7L2. They have concluded that the observed trends of obesity risk alleles for risk of stroke/TIA as well as the possible sex-specific differences in clinical outcomes found for the TCF7L2 (rs7903146) require replication in future studies.

Dellasega C et al., (2011) conducted a study to determine how patients with type 2 DM feel about a motivational interviewing (MI) intervention designed to promote positive behavior change. The method used was qualitative study and the participants were four focus groups consisting of nineteen adult patients with type II diabetes mellitus solicited from a large NIH-funded randomized controlled trial of motivational interviewing and diabetes. Five themes related to MI emerged: Nonjudgmental Accountability, Being Heard and Responded to as a Person, Encouragement and Empowerment, Collaborative Action Planning and Goal Setting, and Coaching rather than Critiquing. They have concluded that some patients with type II diabetes are receptive to motivational interviewing which is a provider approach that is more patient-centered and empowering than traditional care.

Djousse L et al., (2011) had conducted a study to examine the association between modifiable lifestyle factors and residual lifetime risk of diabetes. The method of study was Prospective cohorts involving 20,915 men (1982-2008) and 36,594 women (1992-2008). The age of 45, the residual lifetime risk of diabetes (95% CI) for men with 0, 1, 2, 3, and 4 + healthy lifestyle factors was 30.5 (27.3-33.7);

21.5 (19.9-23.0); 15.1 (13.9-16.3); 10.3 (9.1-11.5); and 7.3 (5.7-8.9) percent; respectively. The corresponding values for women were 31.4 (28.3-34.5); 24.1 (21.8-26.5); 14.2 (12.7-15.7); 11.6 (9.7-13.5); and 6.4 (4.2-8.6) percent, respectively. They have concluded that the data showed an inverse and graded relation between desirable lifestyle factors and residual lifetime risk of diabetes in men and women. Not smoking and moderate drinking may have additional benefits when added to exercise, weight control, and diet.

Studies Related to Type II Diabetes and Diet

Post RE et al., (2012) carried out a study to determine if an increase in dietary fiber affects glycosylated hemoglobin (HbA1c) and fasting blood glucose in patients with type 2 diabetes mellitus. Randomized studies published from January 1, 1980, to December 31, 2010, that involved an increase in dietary fiber intake as an intervention, evaluated HbA1c and/or fasting blood glucose as an outcome, and used human participants with known type 2 diabetes mellitus were selected for review. The results showed that the overall mean difference of fiber versus placebo was a reduction of fasting blood glucose of 0.85 mmol/L (95% CI, 0.46-1.25) and decrease in HbA1c with an overall mean difference of 0.26% (95% CI, 0.02-0.51). They have concluded that increasing dietary fiber in the diet of patients with type 2 diabetes is beneficial and should be encouraged as a disease management strategy.

Mangou A et al., (2011) assessed the diet quality in patients with T2DM and comorbid obesity compared to patients with T2DM alone and to examine the association between comorbidities and diet quality. The sample size composed of 59 adult patients with diabesity (T2DM and comorbid obesity) and 94 patients with T2DM alone. The

results showed that the mean raw Health Eating Index of the diabese subjects was 81.9±7.1 and the diabetic subjects was 80.2±6.9. Among comorbidities, only renal disease decreased HEI. In the diabese, adequate HEI was explained by diabetic foot syndrome, smoking, drinking alcohol and having a family history of diabetes. They have concluded that adult patients with T2DM demonstrate adequate diet quality.

Mueller JE et al., (2011) assessed the effect of dietary carbohydrate-restriction in conjunction with metformin and liraglutide on metabolic control in patients with type 2 diabetes. Forty patients with type 2 diabetes already being treated with two oral anti-diabetic drugs or insulin treatment and who showed deterioration of their glucose metabolism (i.e. HbA1c > 7.5), were treated. A carbohydrate-restricted diet and a combination of metformin and liraglutide were instituted, after stopping either insulin or oral anti-diabetic drugs (excluding metformin). The results showed that seventy-one percent of the patients reached HbA1c values below 7.0 percent. The average weight loss after six months was 10 percent. They have concluded that Carbohydrate restriction in conjunction with metformin and liraglutide is an effective treatment option for patients with advanced diabetes who are candidates for instituting insulin or who are in need of intensified insulin treatment.

Brooking LA et al., (2011) carried out a study to assess the effects of fiber rich carbohydrate and fat reduction (HCHF) and a High Protein (HP) diet on body fat in indigenous people at high risk of type II diabetes. Eighty-four participants were randomized to three groups. The results showed that the body weight was reduced throughout on HP -2.6 (95% confidence interval: -4.4, -0.8) kg and HCHF (-1.6 (-3.0, -0.3) kg) compared with CONT. Total body fat

(-1.6 (-3.0, -0.3) kg) and waist circumference (-3.0 (-5.7, -0.2) cm) showed sustained decreases on HP compared with CONT. They have concluded that the moderate weight loss occurred on both HP and HCHF; HP was associated with some further favourable differences compared with the control group.

Wei I et al., (2011) conducted a study to assess the effects of computer-assisted versus oral-and-written dietary history taking on patient outcomes for diabetes mellitus. Randomized controlled trials were used. The results showed that of the 2991 studies retrieved; only one study with 38 study participants compared the two methods of history taking over a total of eight weeks. The authors found that as patients became increasingly familiar with using Computer-Assisted History Taking Systems (CAHTS), the correlation between patients' food records and computer assessments improved. They have concluded that CAHTS may be well received by study participants and potentially offer time saving in practice.

Studies Related to Type II Diabetes and Exercise

Balducci S et al., (2012) examined the effect of supervised exercise on traditional and non-traditional cardiovascular risk factors in sedentary, overweight/obese insulin-treated subjects with type 2 diabetes from the Italian Diabetes Exercise Study (IDES). The study randomized 73 insulin-treated patients to twice weekly supervised aerobic and resistance training plus structured exercise counseling (EXE) or to counseling alone (CON) for 12 months. The results showed that the volume of physical activity was significantly higher in the EXE versus the CON group. Values for hemoglobin A(1c), BMI, waist circumference, high-sensitivity C-reactive protein, blood pressure, LDL cholesterol, and the coronary heart disease risk score

were significantly reduced only in the EXE group. They have concluded that in insulin-treated subjects with type 2 diabetes, supervised exercise is safe and effective in improving glycemic control and markers of adiposity and inflammation, thus counterbalancing the adverse effects of insulin on these parameters.

Bello AI et al., (2011) evaluated the effects of an 8-week aerobic exercise program on physiological parameters and quality of life in patients with type 2 diabetes mellitus. Patients were randomly assigned to an intervention or control group by ballot. The intervention group, in addition to regular conventional treatment, received individually prescribed aerobic exercise for 30 minutes, at 50 percent to 75 percent of maximum heart rate three times weekly. The results showed that intervention group improved significantly ($P < 0.05$) in their post exercise quality of life compared with baseline. They have concluded that patients with type II diabetes improved in fasting blood sugar, low-density lipoprotein, high-density lipoprotein, and quality of life following eight weeks of aerobic exercise training.

Tuttle LJ et al., (2011) evaluated a successful and safe progressive exercise program for an individual with diabetes mellitus and peripheral neuropathy (DM+PN). The patient was a 76-year-old man with a 30-year history of DM+PN. He participated in a 12-week, moderate-intensity, progressive exercise program (heart rate approximately 75 percent of maximum heart rate; rate of perceived exertion=11-13; 3 times per week) involving walking on a treadmill, balance exercises, and strengthening exercises for the lower extremities using body weight resistance. Dorsiflexor and plantar-flexor peak torque increased (dorsiflexor peak torque: right side=4.5-4.6 N·m, left side=2.8-3.8 N·m; plantar-flexor peak torque: right side=44.7-62.4 N·m, left side=40.8-56.0 N·m), as did his average

daily step count (6,176-8,273 steps/day). They have concluded that a moderate-intensity exercise program was successful in increasing some measures of muscle strength, physical function and activity without causing injury to an individual with DM+PN.

Kwon HR et al., (2011) investigated the effects of an aerobic and resistance training program on endothelial function, and the influences of glycemic control, body weight changes, and aerobic capacity in T2DM. Total 40 overweight women with T2DM were assigned into three groups: an aerobic exercise group (AEG, n=13), Resistance Exercise Group (REG, n=12), and Control Group (CG, n=15). The results showed that flow-mediated dilation increased by 2.2±1.9 percent in AEG, which differed from REG and CG (P=0.002), despite of decreased Body Weight (BW) in both AG and RG (2.8±2.5%, P=0.002; 1.6±2.0%, P=0.017, respectively). They have concluded that aerobic exercise appears to be more beneficial than resistance exercise for improving endothelial function in T2DM.

Little JP et al., (2011) examined the effects of low-volume High-intensity Interval Training (HIT) on glucose regulation and skeletal muscle metabolic capacity in patients with type 2 diabetes. Eight patients with type 2 diabetes (63 ± 8 yr, body mass index 32 ± 6 kg/m (2), Hb (A1C) 6.9 ± 0.7%) volunteered to participate in this study. Average 24-h blood glucose concentration was reduced after training (7.6 ± 1.0 vs. 6.6 ± 0.7 mmol/l) as was the sum of the 3-h postprandial areas under the glucose curve for breakfast, lunch, and dinner (both $P < 0.05$). They have concluded that low-volume HIT can rapidly improve glucose control and induce adaptations in skeletal muscle that are linked to improved metabolic health in patients with type 2 diabetes.

Studies Related to the Effectiveness of Fenugreek on the Blood Glucose Level in Type II Diabetes Mellitus

Suksomboon N et al., (2011) performed a systematic review and meta-analysis to evaluate the effect of herbal supplement on glycemic control in type II diabetes. Randomized controlled trials were identified through electronic searches (MEDLINE, EMBASE and Cochrane Central Register of Controlled Trials) up until February 2011. The results showed that Ipomoea batatas, Silybum marianum and Trigonella foenum-graecum significantly improved glycemic control. The pooled mean differences in HbA(1c) were -0.30 percent (95% CI -0.04% to -0.57%; P = 0.02), -1.92% (95% CI -0.51% to -3.32%; P = 0.008), and -1.13% (95% CI -0.11% to -2.14%; P = 0.03), respectively, for Ipomoea batatas, Silybum marianum, and Trigonella foenum-graecum. They have concluded that the supplementation with Ipomoea batatas, Silybum marianum, and Trigonella foenum-graecum may improve glycemic control in type 2 diabetes.

Kassaian N et al., (2009) evaluated the hypoglycaemic and hypolipidemic effects of fenugreek seeds in type II diabetic patients. In a clinical trial study, 24 type II diabetic patients were placed on ten grams/day powdered fenugreek seeds mixed with yoghurt or soaked in hot water for eight weeks. The results showed that FBS, TG and VLGL-C decreased significantly (25%, 30% and 30.6% respectively) after taking fenugreek seed soaked in hot water. They concluded that fenugreek seeds can be used as an adjuvant in the control of type II diabetes mellitus in the form of soaked in hot water.

Losso JN et al., (2009) assessed the effect of fenugreek bread on diabetes mellitus. They developed a fenugreek bread formula that was produced in a commercial bakery by the incorporating fenugreek

flour into a standard wheat bread formula. Eight diet-controlled diabetic subjects were served two slices (56g) and 5 percent fenugreek. Blood glucose and insulin were tested periodically over a four hours period after consumption. The tests were run on two occasions one week apart, once with the fenugreek bread and once with regular bread. The study was double-blind and the order was randomized and balanced. They concluded that the bread maintained fenugreek's functional property of reducing insulin resistance.

Lu FR et al., (2008) carried out a study to evaluate the efficacy and safety of Trigonella Foenum-Graecum L. total saponins (TFGs) in combination with Sulfonyl Ureas (SU) in the treatment of patients with type 2 diabetes mellitus (T2DM) not well controlled by SU alone. Sixty-nine T2DM patients were randomly assigned to the treated group (46 cases) and the control group (23 cases), and were given TFGs or placebo three times per day, six pills each time for 12 weeks, respectively. Meanwhile, the patients continued taking their original hypoglycemic drugs. The results showed that there were statistically remarkable decreases in aspect of fast blood glucose, 2h post-prandial blood glucose, glycosylated haemoglobin (HbA1c) and Clinical Symptomatic Quantitative Scores (CSQS) in the treated group as compared to those in the control group ($P<0.05$ or $P<0.01$). They have concluded that the combined therapy of TFGs with sulfonylureas hypoglycemic drug could lower the blood glucose level and ameliorate clinical symptoms in the treatment of T2DM and the therapy was relatively safe.

Bradley R et al., (2007) carried out a study in Bastyr University Kenmore, USA, for complementary and alternative medicine practice and research in type II diabetes patients. Available literature on nutritional and botanical medicine were reviewed and

categorized. The literature describing laboratory assessment for glycemic control, insulin resistance, and beta cell resistance, and beta cell reserve was also reviewed and a clinical decision tree was developed. The findings of the study were nutritional and botanical medicines using validated laboratory measures were used for glycemic control. Herbs like fenugreek were used for glycemic control in diabetes mellitus. The study concluded that fenugreek can be used for glycemic control in diabetes.

Jung, M et al., (2006), conducted a review in Yonsei University, Korea, with the aim to find out the anti-diabetic agents from medical plants. The review analyzed that currently available therapeutic options for non-insulin dependent diabetes mellitus, such as dietary modifications, oral hypoglycemics, and insulin have limitations of their own. The findings of the review were that medicinal plants have shown experimental or clinical anti-diabetic activity and that have been used in traditional systems of medicine include Trigonella foenum graecum. The review concluded that Trigonella graecum has been reported as beneficial for treatment of type II diabetes.

Kochhar A and Nagi M (2005) assessed the effect of supplementation of a powdered mixture of three traditional medicinal plants-bittergourd, jamun seeds, and fenugreek seeds in the raw and cooked form on blood glucose were studied in 60 non-insulin dependent male diabetics. The patients were divided into two groups of 30 each. The patients of group I was given the raw powdered mixture in the form of capsules: the patients of group II were given this mixture in the form of salty biscuits. Daily supplementation of one gram of this powdered mixture for one and a half month period and then a further increase to two gram for another one and a half

month significantly reduced the fasting as well as the postprandial glucose level of the diabetic patients. A significant decrease in oral hypoglycemic drug intake and decline in percentage of the subjects who were on hypoglycemic drugs were found after the three months feeding trial. They have concluded that two gram of a powdered mixture of traditional medicinal plants in either raw or cooked form can be successfully used for lowering blood glucose in diabetics.

Shekelle PG et al., (2005) conducted a study to evaluate and synthesize the evidence on the effect of Ayurvedic therapies for diabetes mellitus. The design used was a systematic review of trials. The most-studied herbs were G sylvestre, C indica, fenugreek and Eugenia jambolana. Thirty-five of the studies included came from the Western literature, 27 from the Indian. Seven were Randomized Controlled Trials (RCTs) and ten Controlled Clinical Trials (CCTs) or natural experiments. Twenty-two studies went on to further analysis based on a set of criteria. Of these, ten were RCTs, CCTs, or natural experiments, 12 were case series or cohort studies. There was evidence to suggest that the herbs C indica, holy basil, fenugreek, and G sylvestre, and the herbal formulas Ayush-82 and D-400 have a glucose-lowering effect and deserve further study. They have concluded that there is heterogeneity in the available literature on Ayurvedic treatment for diabetes.

Al-Rowais NA., (2002) determined the prevalence of the use of herbs among diabetics and which type of herbs are used. A cross sectional study was conducted on diabetic patients attending the outpatient clinics in 4 major hospitals in Riyadh, Kingdom of Saudi Arabia. They were: King Khalid University Hospital, King Abdul-Aziz University Hospital, Prince Salman Hospital and Riyadh Medical Complex over a three months period which started in

September, 1999. The results showed that two hundred and ninety six diabetic patients out of 300 were interviewed giving a response rate of 98.6 percent. Fifty-one subjects (17.4%) reported using some form of herbs. The common herbs used were myrrh, black seed, helteet, fenugreek and aloes. They have concluded that the use of herbs is not rare among diabetic patients.

Gupta A et al., (2001) evaluated the effects of Trigonella foenum-graecum (fenugreek) seeds on glycemic control and insulin resistance, determined by Homeostatic Model Assessment (HOMA) model, in mild to moderate type II diabetes mellitus was performed a double blind placebo controlled study. Twenty five newly diagnosed patients with type II diabetes (fasting glucose < 200 mg/dl) were randomly divided into two groups. Group I (n=12) received 1 gm/day hydroalcoholic extract of fenugreek seeds and Group II (n=13) received usual care (dietary control, exercise) and placebo capsules for two months. The results showed that area under curve (AUC) of blood glucose (2375 +/- 574 vs 27597 +/- 274) as well as insulin (2492 +/- 2536 vs. 5631 +/- 2428) was significantly lower ($p < 0.001$). HOMA model derived insulin resistance showed a decrease in percent beta-cell secretion in group 1 as compared to group 2 (86.3 +/- 32 vs. 70.1 +/- 52) and increase in percent insulin sensitivity (112.9 +/- 67 vs 92.2 +/- 57) ($p < 0.05$). They have concluded that the adjunct use of fenugreek seeds improves glycemic control and decreases insulin resistance in mild type-II diabetic patients.

CHAPTER- III

RESEARCH METHODOLOGY

This chapter explains the methods adopted by the investigator to assess the effectiveness of fenugreek. It deals with research approach, research design, setting of the study, population, criteria for sample selection, sample and sampling technique, development of the tool, validity, reliability, pilot study, procedure for data collection, plan for data analysis and protection of human rights.

RESEARCH APPROACH

Quantitative approach was used for this study.

RESEARCH DESIGN

Research design is the overall plan for addressing a research question, including specification for enhancing the integrity of the study (Polit & Hungler, 1999).

Quasi-experimental design was used in this study.

The design is represented below:

Group	Pre-test	Intervention	Post-test
Experimental Group	Fasting blood glucose level O1	20 grams of fenugreek powder in 200ml of water with oral hypoglycemic agent X	Fasting blood glucose level O2
Control Group	Fasting blood glucose level O3	Oral hypoglycemic agent ---	Fasting blood glucose level O4

SETTING OF THE STUDY

Setting is the physical location and condition in which data collection takes place (Polit & Hungler, 1999).

The study was conducted at Karunai Multi Speciality Hospital, Madurai. The prime place is located in Bibikulam. It consists of Diabetelogy Department, ICU, Obstetrics and Gynecology Department, Casualty for Emergency and Trauma, Oncology Department, Head injury clinic, one major theatre and one minor theatre, Biochemistry lab, facilities for X-ray, CT scan and ECG. Approximately 350 patients per month visit Diabetology Department for consultation and treatment. Among them 230 patients are under oral hypoglycemic agent.

POPULATION

Population refers to the entire aggregation of samples that meet the designated criteria. It also refers to the entire set of individuals who have some common characteristics and it is important to make a distinction between the target and accessible population (Polit & Hungler, 1999).

Target Population

The target population of the present study comprises of all the patients having type II diabetes mellitus.

Accessible Population

The accessible population comprises of all the patients having type II diabetes mellitus and admitted at selected Hospitals, Madurai.

SAMPLE

The samples are patients with type II diabetes mellitus who were selected from the Karunai Multi Speciality Hospital, Madurai.

SAMPLE SIZE

The sample size was 60 subjects with type II diabetes mellitus, of which 30 patients were in the experimental group and 30 patients were in the control group.

SAMPLING TECHNIQUE

Purposive sampling technique was used for this study. According to Polit and Hungler (2004), “Purposive or judgemental sampling is based on the belief that a researcher whose knowledge about the population can be used to hand pick sample members to be included in the sample”. The researcher wanted to select patients based on specific criteria and this technique was found to be appropriate for the purpose of the study.

CRITERIA FOR SAMPLE SELECTION

The sample was selected based on the following inclusion and exclusion criteria.

Inclusion criteria

1. Subjects with type II diabetes mellitus only on oral hypoglycemic agent
2. Subjects with fasting blood glucose level of more than 110mg/dl.
3. Both male and female subjects.
4. Subjects who can speak and understand Tamil.

5. Subjects who were willing to participate in the study

Exclusion criteria

1. Subjects who are on insulin administration.
2. Subjects with associated diseases like cardio vascular disease, foot ulcer, paralysis, gastrointestinal problem and asthma.

DESCRIPTION OF THE TOOL

The tool was developed after an extensive review of literature and considering the opinion given by the medical and the nursing experts.

The tool for data collection consists of two sections:

Section-A

It comprises of demographic variables such as age, sex, religion, marital status, educational status, occupation, family income, family history of diabetes, personal habits, diet, duration of treatment taken, following diabetic diet and habit of doing exercises.

Section-B

This consists of a bio-physiological measure for assessing the level of blood glucose.

The standardized glucometer was used for the study purpose.

- ❖ Ultra one touch glucometer was used.
- ❖ SN: CHKC4043TT
- ❖ LOT: T1104043X
- ❖ P/N: 02080708 D

- ❖ Manufactured for Lifescan Inc, Milpitas CA., USA
- ❖ Meter and carry case made in China
- ❖ Lancets made in Japan
- ❖ Test strips made in UK
- ❖ Penlets and control solution made in USA

The normal value of fasting blood glucometer level is 70 to 110mg/dl.

Description of the Intervention

The fenugreek seeds were grinded using mixie and packed as 20gm packets. It was mixed with 200ml of water and given before breakfast for 15 days to the samples in experimental group.

VALIDITY

The content was validated by one physician, three medical surgical nursing experts and one dietician. The expert's suggestions were incorporated and a standardized glucometer was used for the main study.

RELIABILITY

The reliability of the tool was obtained by establishing the test re-test method. The r value was 0.86. The score indicates a high correlation and hence the tool was considered as highly reliable.

PILOT STUDY

Before conducting the pilot study formal consent was obtained from the Managing Director of the Karunai Multi Specialty Hospital, Madurai.

In order to test the feasibility, relevance and practicability of the study a pilot study was conducted among six samples with type II diabetes mellitus (among those three samples in the experimental group, three samples in the control group) in the same manner as that of the original study. Data were analyzed to find out the suitability of statistical method. It revealed that the study was feasible. The samples included in the pilot study were excluded in the main study.

DATA COLLECTION PROCEDURE

Before starting the study the researcher obtained formal permission to conduct the study from the hospital authority and the dissertation committee of Matha College of nursing, Manamadurai. The period of study extended for six weeks. The researcher introduced herself to the selected samples and verbal consent was obtained from each subject after giving assurance of confidentiality. Each day data was collected from five to six samples for 20 minutes. The clients participated with interest after the physician's consent. The subjects were divided into experimental group (30 samples) and control group (30 samples). The researcher was provided accommodation along with the hospital staff. From there the researcher went to the sample's house and inspected regularly.

Initially the researcher explained the procedure to the samples. From the next day onwards pre-test fasting blood glucose level was assessed by using a glucometer.

Step 1:

The lancet was inserted into the lancet holder after the protective disk was removed and then the cap counter was turned anticlockwise. Then the ejection control was slid back until it clicks.

Hand washing was done to reduce the chance of infection. The test strip was inserted with contact bar's end first and facing up, into the test port. The meter was turned on and the display appeared. Then the code number appeared, followed by the blood drop symbol with mg/dl. The code number on the meter had matched with the code number on the test strip vial.

Step 2:

The sampler was held firmly against the side of the sample's forefinger and the release button was pressed. The fingertip was massaged gently to obtain a round drop of blood. The blood drop was placed on the top edge of the test strip until the confirmation window is full before the meter begins to count down.

If the confirmation window is not full, error5 can occur. During the assessment of pre-test for experimental group error5 occurred for two samples and the test was repeated with the new test strip.

Step 3:

After five seconds the blood glucose test result appeared with the unit of mg/dl.

The cap counter was twisted clockwise and the release button pushed followed by pushing forward on the ejection control and ejected the lancet. The lancet was not reused.

Each day five to six samples' data was collected and pre-test was done, followed by administering of 20gm fenugreek powder packet for 15 days and instructed to take daily. After one week the samples for experimental group were selected. They were inspected regularly. After 15 days post-test blood glucose level was again checked using glucometer. During the assessment of post-test for

experimental group error5 occurred for one sample and the test was repeated with new test strip.

Followed by that, control group samples were selected; here the researcher did the pre-test by using glucometer to check the blood glucose level. After 15 days again the post-test blood sugar level was checked using glucometer by not administering the fenugreek. In the control group error5 occurred for one sample in pre-test and two samples in post-test.

PLAN FOR DATA ANALYSIS

The data analysis was done according to the objectives of the study. Both descriptive and inferential statistics were used.

Descriptive Statistics

Frequency, percentage and mean were used for analysis of pre-test and post-test assessments.

Inferential Statistics

Paired ‘t’ test was used to determine the difference between pre-test and post-test blood glucose level in terms of effectiveness of fenugreek. Chi-square was used to determine the association between the post-test level of blood glucose and selected demographic variables in both the groups.

PROTECTION OF HUMAN RIGHTS

The dissertation committee approved the research proposal prior to the pilot study and the main study. Permission was obtained from the Head of the Department of Medical Surgical Nursing, Matha College of Nursing, Manamadurai and from the hospital authority. Assurance was given to the study subjects that confidentiality would be maintained.

CHAPTER – IV

ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the analysis of the samples and the interpretation of data to determine the "Effectiveness of fenugreek powder on reducing blood glucose level among patients with type II diabetes mellitus in Karunai Multi Speciality Hospital, Madurai".

According to Polit (2007), analysis helps a researcher to make a sense of quantitative information. Statistical procedure enables researcher to summarize, organize, evaluate, interpret and communicate numeric information.

The obtained data has been classified, grouped, and analyzed statistically, based on the objectives of the study.

OBJECTIVES

1. To assess the pre-test level of blood glucose among patients with Type II diabetes mellitus in experimental group and control group.
2. To assess the post-test level of blood glucose among patients with Type II diabetes mellitus in experimental group and control group.
3. To find out the effectiveness of fenugreek powder in reducing the blood glucose level among patients with Type II diabetes mellitus in the experimental group.

4. To associate the post-test level of blood glucose and selected demographic variables in the experimental group.

5. To associate the post-test level of blood glucose and selected demographic variables in the control group.

ORGANIZATION OF DATA

The findings of the study were grouped and analyzed under the following sections.

Section-A : Distribution of samples based on their selected demographic variables among experimental and control groups.

Section-B : Distribution of samples based on their blood glucose level in pre-test and post-test of experimental and control groups.

Section-C : Comparison of mean pre-test and post-test blood glucose level of samples in experimental group.

Section-D : Association between post-test blood glucose level among patients with type II diabetes mellitus in the experimental group and their selected demographic variables.

Section-E : Association between post-test blood glucose level among patients with type II diabetes mellitus in the control group and their selected demographic variables.

SECTION-A

Table-1:

Distribution of samples based on their selected demographic variables among experimental and control groups.

(N=60)

S. No	Demographic Variables		Experimental group (n=30)		Control group (n=30)	
			f	%	f	%
1.	Age (years)	a) 30-40	8	26.7	6	20
		b) 41-50	9	30	11	36.7
		c) 51-60	9	30	8	26.7
		d) Above 60	4	13.3	5	16.7
2.	Sex	a) Male	17	56.7	20	66.7
		b)Female	13	43.3	10	33.3
3.	Religion	a)Hindu	9	30	15	50
		b)Christian	10	33.3	8	26.7
		c)Muslim	11	36.7	7	23.3
		d)Others	0	0	0	0
4.	Marital Status	a)Married	23	76.7	23	76.7
		b)Unmarried	4	13.3	3	10
		c)Widowed	3	10	4	13.3
		d)Divorced	0	0	0	0
5.	Educational Status	a)Illiterate	4	13.3	6	20
		b)Primary education	4	13.3	4	13.3
		c)Higher secondary education	8	26.7	7	23.3
		d)Diploma	6	20	6	20
		e)Degree	4	13.3	4	13.3
		f) Postgraduate	4	13.3	3	10

S. No	Demographic variables		Experimental group (n=30)		Control group (n=30)	
			f	%	f	%
6.	Occupation	a) Unemployed	10	33.3	5	16.7
		b) Coolie	4	13.3	7	23.3
		c) Government employee	6	20	7	23.3
		d) Private employee	6	20	7	23.3
		e) Self employee	4	13.3	4	13.3
7.	Family income (Rs)	a) Below 2000	4	13.3	4	13.3
		b) 2000-4000	8	26.7	5	16.7
		c) 4001-6000	10	33.3	9	30
		d) Above 6000	8	26.7	12	40
8.	Family history of diabetes	a) Parents	12	40	13	43.3
		b) Siblings	9	30	9	30
		c) None	9	30	8	26.7
9.	Personal habits	a) Alcoholic	10	33.3	12	40
		b) Tobacco chewing & betel leaves chewing	1	3.3	0	0
		c) Drugs	0	0	0	0
		d) Smoking	7	23.3	8	26.7
		e) None	12	40	10	33.3
10.	Diet	a) Vegetarian	9	30	6	20
		b) Non-vegetarian	3	10	7	23.3
		c) Mixed	18	60	17	56.7
11.	Duration of treatment taken (yrs)	a) 1-3	7	23.3	9	30
		b) 4-6	15	50	12	40
		c) 7-9	7	23.3	6	20
		d) More than 9	1	3.3	3	10

S. No	Demographic variables		Experimental group (n=30)		Control group (n=30)	
			f	%	f	%
12.	Following diabetic diet	a)Yes b)No	14 16	46.7 53.3	15 15	50 50
13.	Habit of doing exercises	a)Yes b)No	16 14	53.3 46.7	6 24	20 80

Table 1 shows the distribution of samples according to their selected demographic variables such as age, sex, religion, marital status, educational status, occupation, family income, family history of diabetes, personal habits, diet, duration of treatment taken, following diabetic diet and habit of doing exercises both in experimental group and control group.

Regarding age in the experimental group, 8 (26.7%) samples were between the age group of 30-40 years, 9 (30%) samples were between 41-50 years and 51-60 years, and 4 (13.3%) samples were above 60 years. In the control group 6 (20%) samples were between 30-40 years, 11 (36.7%) samples were between 41-50 years, 8 (26.7%) samples were between 51-60 years and 5 (16.7%) were above 60 years.

Regarding sex in the experimental group, 17 (56.7%) samples were males and 13 (43.3%) samples were females. In the control group 20 (66.7%) samples were males and 10 (33.3%) were females.

Regarding religion in the experimental group, 9 (30%) samples were Hindus, 10 (33.3%) samples were Christians, 11 (36.7%)

samples were Muslims, and others were 0 (0%). In the control group 15 (50%) samples were Hindus, 8 (26.7%) samples were Christians, 7 (23.3%) samples were Muslims and others were 0 (0%).

Regarding marital status in the experimental group, 23 (76.7%) samples were married, 4 (13.3%) samples were unmarried, 3 (10%) samples were widowed and divorced were 0 (0%). In the control group 23 (76.7%) samples were married, 3 (10.0%) samples were unmarried, 4 (13.3%) samples were widowed and divorced were 0 (0%).

Regarding educational status in the experimental group, 4 (13.3%) samples were illiterate and had primary education, 8 (26.7%) had higher secondary education, 6 (20%) had finished diploma and 4 (13.3%) had finished degree and postgraduate degree. In the control group 6 (20%) samples were illiterates, 4 (13.3%) had primary education, 7 (23.3%) had higher secondary education, 6 (20%) had finished diploma, 4 (13.3%) had finished degree and 3 (10%) had finished postgraduate degree.

Regarding occupation in the experimental group, 10 (33.3%) subjects were unemployed, 4 (13.3%) subjects were coolies, 6 (20%) subjects were government and private employees, and 4 (13.3%) were self employees. In the control group, 5 (16.7%) subjects were unemployed, 7 (23.3%) were coolies, government and private employees and 4 (13.3%) subjects were self employees.

Regarding family income in the experimental group, 4 (13.3%) samples were getting below Rs.2000, 8 (26.7%) samples were getting between Rs.2000-4000, 10 (33.3%) samples were getting between Rs.4001-6000 and 8 (26.7%) were getting above Rs.6000. In the control group, 4 (13.3%) samples were getting below Rs.2000, 5

(16.7%) samples were getting between Rs.2001-4000, 9 (30%) samples were getting between Rs.4001-6000, and 12 (40%) samples were getting above Rs.6000.

Regarding family history of diabetes in the experimental group, for 12 (40%) subjects, their parents were having diabetes and for 9 (30%) subjects, their siblings were having diabetes and also no history of diabetes. In the control group, for 13 (43.3%) of subjects, their parents were having diabetes, for 9 (30%) subjects, their siblings were having diabetes and for 8 (26.7%) subjects, there is no family history of having diabetes.

Regarding personal habits in the experimental group, 10 (33.3%) samples were alcoholic, 1 (3.3%) sample was having the habit of tobacco and betel leaves chewing, 0 (0%) was having addiction of drugs, 7 (23.3%) were smokers and 12 (40.0%) were having none. In the control group, 12 (40%) were alcoholic, 0 (0%) was having the habit of taking tobacco and betel leaves chewing and drug addiction, 8 (26.7%) samples were smokers and 10 (33.3%) were having none.

Regarding diet in the experimental group, 9 (30%) samples were vegetarians, 3 (10%) were non-vegetarians and 18 (60%) were having the habit of taking mixed diet. In the control group, 6 (20%) samples were vegetarians, 7 (23.3%) were non-vegetarians and 17 (56.7%) samples were having the habit of taking mixed diet.

Regarding the duration of treatment taken, in the experimental group, 7 (23.3%) subjects were between 1-3 years, 15 (50%) were between 4-6 years, 7 (23.3%) were between 7-9 years and 1 (3.3%) was on treatment for more than 9 years. In the control group, 9 (30%) subjects were between 1-3 years, 12 (40%) were between 4-6 years, 6

(20%) were between 7-9 years and 3 (10%) were on treatment for more than 9 years.

Regarding following diabetic diet, in the experimental group, 14 (46.7%) samples were following diabetic diet and 16 (53.3%) were not followed. In the control group, 15 (50.0%) were following diabetic diet and 15 (50.0%) were not followed.

Regarding habit of doing exercises in the experimental group, 16 (53.3%) subjects were doing exercises and 14 (46.7%) were not doing exercises. In the control group, 6 (20%) subjects were doing exercises and 24 (80%) were not doing exercises.

SECTION-B

Table-2:

Distribution of samples based on their blood glucose level in pre test-and post-test of experimental and control groups.

(N=60)

Blood glucose level(mg/dl)	Experimental group(n=30)				Control group(n=30)			
	Pre-test		Post-test		Pre-test		Post-test	
	f	%	f	%	f	%	f	%
70-110	0	0	7	23.3	0	0	1	3.3
111-150	3	10.0	13	43.3	0	0	4	13.3
151-190	5	16.7	5	16.7	5	16.7	9	30.0
191-230	9	30.0	5	16.7	8	26.7	12	40.0
231-270	9	30.0	0	0	4	13.3	2	6.7
271-310	4	13.3	0	0	13	43.3	2	6.7

Table 2 shows that in the experimental group, the pre-test blood glucose level was 0 (0%) between 70-110mg/dl, 3 (10%) were between 111-150mg/dl, 5 (16.7%) were between 151-190mg/dl, 9 (30%) were between 191-230mg/dl and 231-270mg/dl, and 4 (13.3%) were between 271-310mg/dl. In the post-test blood glucose level, 7 (23.3%) were between 70-110mg/dl, 13 (43.3%) were between 111-150mg/dl, 5 (16.7%) were between 151-190mg/dl and 191-230mg/dl, and 0 (0%) was between 231-270mg/dl and 271-310mgldl.

In the control group, the pre-test blood glucose level shows that 0 (0%) was between 70-110mg/dl and 111-150mg/dl, 5 (16.7%) were between 151-190mg/dl, 8 (26.7%) were between 191-230mg/dl, 4 (13.3%) were between 231-270mg/dl and 13 (43.3%)

were between 271-310mg/dl. In the post-test blood glucose level, 1 (3.3%) were between 70-110mg/dl, 4 (13.3%) were between 111-150mg/dl, 9 (30%) were between 151-190mg/dl, 12 (40%) were between 191-230mg/dl and 2 (6.7%) were between 231-270mg/dl and 271-310mg/dl.

SECTION-C

Table-3:

Comparison of mean pre-test and post-test blood glucose level of samples in experimental group

Measurement	Mean	Mean difference (MD)	Standard deviation (SD)	't' test	Df
Pre test	220.6000	73.9333	42.26729	21.688*	29
Post test	146.6667		38.41007		

***Significant at 0.05 level**

Table 3 shows that in the experimental group the mean pre-test blood glucose level is 220.6000 and mean post-test blood glucose level is 146.6667. The standard deviation in pre-test is 42.26729 and post- test standard deviation is 38.41007. The calculated' t' value is 21.688 and it is statistically significant at 0.05% level.

SECTION-D

Table-4:

Association between post-test blood glucose level among patients with type II diabetes mellitus in the experimental group and their selected demographic variables

(n=30)

Demographic variables	Blood glucose level (mg/dl)						χ^2
	70-110	111-150	151-190	191-230	231-270	271-310	
Age (years)							
30-40	1	3	2	2	0	0	
41-50	2	5	1	1	0	0	3.586#
51-60	3	3	2	1	0	0	
Above 60	1	2	0	1	0	0	
Sex							
Male	5	8	1	3	0	0	3.506#
Female	2	5	4	2	0	0	
Religion							
Hindu	7	2	0	0	0	0	
Christian	0	10	0	0	0	0	44.926*
Muslim	0	1	5	5	0	0	
Others	0	0	0	0	0	0	
Marital status							
Married	6	11	3	3	0	0	
Unmarried	1	1	1	1	0	0	2.962#
Widowed	0	1	1	1	0	0	
Divorced	0	0	0	0	0	0	

Demographic variables	Blood glucose level (mg/dl)						χ^2
	70-110	111-150	151-190	191-230	231-270	271-310	
Educational status							
Illiterate	1	2	1	0	0	0	
Primary Education	0	1	2	1	0	0	17.235#
Higher Secondary Education	0	5	1	2	0	0	
Diploma	3	2	1	0	0	0	
Degree	1	1	0	2	0	0	
Postgraduate	2	2	0	0	0	0	
Occupation							
Unemployed	1	4	2	3	0	0	
Coolie	0	2	1	1	0	0	
Government Employee	2	3	1	0	0	0	8.392#
Private Employee	3	2	1	0	0	0	
Self Employee	1	2	0	1	0	0	
Family income(Rs)							
Below 2000	1	2	1	0	0	0	
2001-4000	0	4	2	2	0	0	10.108#
4001-6000	3	2	2	3	0	0	
Above 6000	3	5	0	0	0	0	
Family history of diabetes							
Parents	2	7	3	0	0	0	
Siblings	2	3	1	3	0	0	6.158#
None	3	3	1	2	0	0	

Demographic variables	Blood glucose level (mg/dl)						χ^2
	70-110	111-150	151-190	191-230	231-270	271-310	
Personal habits							
Alcoholic	4	3	1	2	0	0	
Tobacco and betel leaves chewing	0	1	0	0	0	0	7.987#
Drugs	0	0	0	0	0	0	
Smoking	2	4	0	1	0	0	
None	1	5	4	2	0	0	
Diet							
Vegetarian	3	4	1	1	0	0	
Non-vegetarian	0	2	1	0	0	0	3.225#
Mixed	4	7	3	4	0	0	
Duration of treatment taken(years)							
1-3	2	3	0	2	0	0	
4-7	4	4	5	2	0	0	9.498#
7-9	1	5	0	1	0	0	
Above 9	0	1	0	0	0	0	
Following diabetic diet							
Yes	7	6	1	0	0	0	13.805*
No	0	7	4	5	0	0	
Habit of doing exercises							
Yes	7	8	1	0	0	0	14.417*
No	0	5	4	5	0	0	

***= Significant at 0.05 level**

#= Not significant at 0.05 level

Table-4 shows the association between post-test blood glucose level among patients with type II diabetes mellitus in the experimental group and their selected demographic variables. The results show that the calculated value of the post-test blood glucose level and demographic variables such as religion, following diabetic diet and habit of doing exercises of patients with type II diabetes mellitus is greater than the table value (at 0.05 level). So, it is concluded that there is a **significant association** between post-test blood glucose level and demographic variables such as religion, following diabetic diet and habit of exercises of patients with type II diabetes mellitus in experimental group.

The calculated value is less than the tabulated value (at 0.05 level) for age, sex, marital status, educational status, occupation, family income, family history of diabetes, personal habits, diet and duration of treatment taken of samples. So, there is **no association** between post-test blood glucose level and demographic variables such as age, sex, marital status, educational status, occupation, family income, family history of diabetes, personal habits, diet and duration of treatment taken by patients with type II diabetes mellitus in group.

SECTION-E

Table-5:

Association between post-test blood glucose level among patients with type II diabetes mellitus in the control group and their selected demographic variables

(n=30)

Demographic variables	Blood glucose level (mg/dl)						χ^2
	70-110	111-150	151-190	191-230	231-270	271-310	
Age (years)							
30-40	1	3	1	1	0	0	
41-50	0	0	6	4	0	1	21.408#
51-60	0	1	1	4	1	1	
Above 60	0	0	1	3	1	0	
Sex							
Male	0	2	5	10	2	1	5.671#
Female	1	2	4	2	0	1	
Religion							
Hindu	0	3	5	7	0	0	
Christian	0	1	4	3	0	0	21.491*
Muslim	1	0	0	2	2	2	
Others	0	0	0	0	0	0	
Marital status							
Married	0	2	8	10	2	1	
Unmarried	1	2	0	0	0	0	21.788*
Widowed	0	0	1	2	0	1	
Divorced	0	0	0	0	0	0	

Demographic variables	Blood glucose level (mg/dl)						χ^2
	70-110	111-150	151-190	191-230	231-270	271-310	
Educational status							
Illiterate	0	0	2	3	0	1	
Primary Education	0	0	2	2	0	0	22.053#
Higher Secondary Education	0	1	3	2	1	0	
Diploma	0	1	0	3	1	1	
Degree	0	1	1	2	0	0	
Postgraduate	1	1	1	0	0	0	
Occupation							
Unemployed	0	0	3	1	0	1	
Coolie	0	1	1	5	0	0	
Government Employee	0	0	2	5	0	0	27.746#
Private Employee	1	3	2	0	1	0	
Self Employee	0	0	1	1	1	1	
Family income(Rs)							
Below 2000	0	0	1	2	0	1	
2001-4000	0	0	1	3	1	0	14.994#
4001-6000	0	3	4	1	1	0	
Above 6000	1	1	3	6	0	1	
Family history of diabetes							
Parents	1	1	3	6	0	2	
Siblings	0	2	2	3	2	0	11.129#
None	0	1	4	3	0	0	

Demographic variables	Blood glucose level (mg/dl)						χ^2
	70-110	111-150	151-190	191-230	231-270	271-310	
Personal habits							
Alcoholic	0	1	3	7	0	1	
Tobacco and betel leaves chewing	0	0	0	0	0	0	11.341#
Drugs	0	0	0	0	0	0	
Smoking	0	1	2	3	2	0	
None	1	2	4	2	0	1	
Diet							
Vegetarian	0	2	3	1	0	0	
Non-Vegetarian	0	0	3	2	2	0	15.432#
Mixed	1	2	3	9	0	2	
Duration of treatment taken(years)							
1-3	1	3	3	2	0	0	
4-7	0	1	5	5	0	1	19.861#
7-9	0	0	1	4	1	0	
Above 9	0	0	0	1	1	1	
Following diabetic diet							
Yes	1	4	6	3	0	1	11.000*
No	0	0	3	9	2	1	
Habit of doing exercises							
Yes	1	2	3	0	0	0	11.250*
No	0	2	6	12	2	2	

***= Significant**

#= Not significant

Table 5 shows the association between post-test blood glucose level among patients with type II diabetes mellitus in the control group and their selected demographic variables. The results show that the calculated value for post-test blood glucose level and demographic variables such as religion, marital status, following diabetic diet and habit of doing exercises of patients with type II diabetes mellitus is greater than the table value (at 0.05 level). So, it is concluded that there is a **significant association** between post-test blood glucose level and demographic variables such as religion, marital status, following diabetic diet and habit of exercises of patients with type II diabetes mellitus in the control group.

The calculated value is less than the tabulated value (at 0.05 level) for age, sex, educational status, occupation, family income, family history of diabetes, personal habits, diet and duration of treatment taken of samples. So, there is **no association** between post-test blood glucose level and demographic variables such as age, sex, educational status, occupation, family income, family history of diabetes, personal habits, diet and duration of treatment taken by patients with type II diabetes mellitus in the control group.

CHAPTER – V

DISCUSSION

The aim of the study was to determine the effectiveness of fenugreek powder on reducing blood glucose level among patients with type II diabetes mellitus in Karunai Multi Speciality Hospital, Madurai.

The research design adopted for this study was Quasi-experimental design. The setting of the study was in Karunai Multi Speciality Hospital at Madurai. The sample size consists of 60, in which 30 samples were in the experimental group and 30 in the control group.

The Objectives of the study were:

1. To assess the pre-test level of blood glucose among patients with Type II diabetes mellitus in experimental group and control group.
2. To assess the post-test level of blood glucose among patients with Type II diabetes mellitus in experimental group and control group.
3. To find out the effectiveness of fenugreek powder in reducing the blood glucose level among patients with Type II diabetes mellitus in the experimental group.
4. To associate the post-test level of blood glucose and selected demographic variables in the experimental group.

5. To associate the post-test level of blood glucose and selected demographic variables in the control group.

To assess the pre-test level of blood glucose among patients with type II diabetes mellitus in experimental group and control group

Table – 2 shows that among the experimental group in pre-test blood glucose level the majority of subjects 9 (30%) were between 191-230mg/dl and 231-270mg/dl. Next to that 5 (16.7%) subjects were between 151-190mg/dl; 4 (13.3%) subjects were between 271-310mg/dl; 3 (10%) subjects were between 111-150mg/dl and there were none between 70-110mg/dl.

Whereas among the control group, in pre-test blood glucose level, majority of the subjects 13 (43.3%) samples were between 271-310mg/dl. Followed by that 8 (26.7%) were between 191-230mg/dl; 5 (16.7%) samples were between 151-190mg/dl; 4 (13.3%) samples were between 231-270mg/dl and none were between 70-110mg/dl and 111-150mg/dl.

According to the researcher's point of view there was no one between 70-110mg/dl in the experimental as well as in the control groups. Many of the subjects were above 190mg/dl in both the groups.

To assess the post-test level of blood glucose among patients with type II diabetes mellitus in experimental group and control group.

Table – 2 shows that among the experimental group, in post-test blood glucose level the majority of subjects 13 (43.3%) were between 111-150mg/dl; 7 (23.3%) subjects were between 70-

110mg/dl; 5 (16.7%) subjects were between 151-190mg/dl and191-230mg/dl and no one was between 231-270mg/dl and 271-310mg/dl.

Among the control group, in post-test blood glucose level, the majority of subjects 12 (40%) were between 191-230mg/dl; 9 (30%) subjects were between 151-190mg/dl; 4 (13.3%) subjects were between 111-150mg/dl; 2 (6.7%) subjects were between 231-270mg/dl and 271-310mg/dl and 1 (3.3%) sample was between 70-110mg/dl.

According to the researcher, there was a dramatic reduction in the post-test blood glucose level among the subjects in the experimental group when compared to the control group. In the experimental group, there was no one above 230mg/dl but in the control group, 5 (16.666%) subjects were above 230mg/dl.

This study was supported by **Lu FR et al., (2008)**, in which they evaluate the efficacy and safety of trigonella foenum-graecum L. total saponins (TFGs) in combination with sulfonylureas (SU) in the treatment of patients with type 2 diabetes mellitus (T2DM). Sixty-nine T2DM patients whose blood glucose levels were not well controlled by oral sulfonylureas hypoglycemic drug were randomly assigned to the treated group (46 cases) and to the control group (23 cases), and were given TFGs or placebo three times per day, six pills each time for 12 weeks, respectively and the patients continued taking their original hypoglycemic drugs. The results showed that the subjects in the experimental group were better, when compared to the control group.

To find out the effectiveness of fenugreek powder in reducing the blood glucose level among patients with type II diabetes mellitus in the experimental group.

Table – 3 shows that, there is a reduction in blood glucose level after the intake of fenugreek powder, as the post-test level of blood glucose (146.6667) is lower than the pre-test level (220.6000) and the calculated 't' value (21.688) is higher than the table value at 0.05 level. So, it is concluded that the intake of fenugreek powder is effective in reducing blood glucose level.

This study was supported by **Kassaian et al., (2009),** in which they evaluated the hypoglycemic and hypolipidemic effects of fenugreek seeds in type II diabetic patients and concluded that fenugreek seeds can be used as an adjuvant in the control of type II diabetes mellitus.

During the data collection procedure, the researcher explained about the effect and the uses of fenugreek powder in reducing blood glucose level. The subjects understood its value and started to take fenugreek powder. At last, when they came to know that their blood glucose level has reduced, they felt happy and promised to take a small amount of fenugreek in their daily diet.

To associate the post-test level of blood glucose and selected demographic variables in the experimental group

Table – 4 shows the association between the post-test level of blood glucose and the selected demographic variables of patients with type II diabetes mellitus in experimental group. The result shows that the calculated value is greater than the table value (at 0.05 level). So, it is concluded that there is a significant association between post-test

blood glucose level and demographic variables such as religion, following diabetic diet and habit of doing exercises.

Regarding the religion, the observed chi-square value (42.926) was greater than the tabulated value (11.07) at 0.05 level. According to the researcher's point of view, religion influences the intake of fenugreek powder, which in turn helps in the reduction of blood glucose level. In this study more or less the participants are distributed as Hindu 9 (30.0%), Christian 10 (33.3%) and Muslims 11 (36.7%) equally except others 0 (0%). Hence the researcher accepted the research hypothesis and concluded that there was a significant association between post-test blood glucose level and religion in the experimental group.

Regarding the following of diabetic diet, the calculated chi-square value (13.805) was greater than the tabulated value (7.82) at 5% level of significance. Hence the researcher accepted the research hypothesis and concluded that there was a significant association between post-test blood glucose level and following diabetic diet in the experimental group.

This study was supported by **Mueller JE et al.,** in which they had conducted a study to assess the effect of dietary carbohydrate-restriction in conjunction with metformin and liraglutide on metabolic control in patients with type II diabetes. They have concluded that Carbohydrate restriction in conjunction with metformin and liraglutide is an effective treatment option for patients with advanced diabetes who are candidates for instituting insulin or who are in need of intensified insulin treatment.

According to the researcher's point of view the following diabetic diet along with fenugreek powder will help in the dramatic

reduction of blood glucose level. In this study nearly half of the samples 14 (46.7%) were following diabetic diet in the experimental group.

Regarding the habit of doing exercises, the obtained value (14.417) was greater than the tabulated value (7.82) at 0.05 level. Hence the researcher accepted the research hypothesis and concluded that there was a significant association between post-test blood glucose level and the habit of doing exercises. According to the researcher's point of view, doing exercises regularly helps in the maintenance of normal blood glucose level and if it accompanies with fenugreek powder it will definitely reduce the hyperglycemic effect. In this study 16 (53.3%) samples were having the habit of doing exercises in the experimental group.

The calculated value is less than the tabulated value (at 0.05 level) for age, sex, marital status, educational status, occupation, family income, family history of diabetes, personal habits, diet and duration of treatment taken by patients with type II diabetes mellitus. So, there is no association between post-test blood glucose level and demographic variables such as age, sex, marital status, educational status, occupation, family income, family history of diabetes, personal habits, diet and duration of treatment taken by patients with type II diabetes mellitus.

To associate the post-test level of blood glucose and selected demographic variables in the control group

Table – 5 shows the association between the post-test level of blood glucose and selected demographic variables of patients with type II diabetes mellitus in the control group. The result shows that the calculated value is greater than the table value (at 0.05 level). So,

it is concluded that there is a significant association between post-test blood glucose level and demographic variables such as religion, marital status, following diabetic diet and habit of doing exercises by patients with type II diabetes mellitus.

Regarding the religion in the control group, the calculated chi-square value (21.491) was greater than the tabulated value (15.99) at 5% level of significance. Hence the researcher accepted the research hypothesis and concluded that there was a significant association between post-test blood glucose level and religion. According to the researcher, the religion also influences the pattern of cooking. In this study, half of the samples 15 (50%) were Hindus. They will add fenugreek in their day to day life.

Regarding the marital status, the researcher observed that the chi-square value (21.788) was greater than the tabulated value (15.99) at 5% level of significance. According to the researcher's point of view married persons will have more responsibility than the unmarried persons. They will follow the instructions to live a healthy life. In this study also majority of the samples, 23 (76.7%) were married in the control group. Hence, the researcher accepted the research hypothesis and concluded that there was a significant association between post-test blood glucose level and marital status in the control group.

Regarding following of diabetic diet, the calculated chi-square value (11.00) was greater than the tabulated value (9.24) at 5% level of significance. Hence the researcher accepted the research hypothesis and concluded that there was a significant association between post-test blood glucose level and following of diabetic diet in the control group. According to the researcher's point of view,

following diabetic diet can help in the reduction of blood glucose level to some extent. In this study half of the samples 15 (50%) were following diabetic diet in the control group.

Regarding the habit of doing exercises, the obtained value (11.250) was greater than the tabulated value (9.24) at 0.05 level of significance. Hence the researcher accepted the research hypothesis and concluded that there was a significant association between post test blood glucose level and habit of doing exercises. According to the researcher's point of view, doing exercises regularly helps in the reduction of blood glucose level. In this study only 6 (20%) samples were having the habit of doing exercises in the control group. So, the reduction in the blood glucose level has not been achieved greatly when compared to the experimental group. Hence the researcher accepted the research hypothesis and concluded that there was a significant association between post-test blood glucose level and habit of doing exercises in the control group.

The calculated value is less than the tabulated value (at 0.05 level) for age, sex, educational status, occupation, family income, family history of diabetes, personal habits, diet and duration of treatment taken by patients with type II diabetes mellitus. So, there is no association between post-test blood glucose level and demographic variables such as age, sex, educational status, occupation, family income, family history of diabetes, personal habits, diet and duration of treatment taken by patients with type II diabetes mellitus.

CHAPTER – VI

SUMMARY, IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

This chapter deals with summary, implications for nursing practice, nursing education, nursing administration and nursing research, recommendations and conclusion.

SUMMARY

Diabetes mellitus is a group of metabolic diseases in which a person has high blood sugar, either because the body does not produce enough insulin, or because the cells do not respond to the insulin that is produced. There are three main types of diabetes, type I diabetes, type II diabetes and Gestational diabetes. Type II diabetes results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency.

Type II diabetes mellitus is a chronic medical condition that requires regular monitoring and treatment throughout life. Treatment includes lifestyle, self-care measures, and sometimes medications. Fortunately, these treatments can keep blood glucose levels close to normal and minimize the risk of developing complications.

The intake of fenugreek powder is one of the measures to reduce the blood glucose level. The blood glucose level was found to be reduced in patients with type II diabetes mellitus during the research session. The aim of this study was to determine the

effectiveness of fenugreek powder on reducing the blood glucose level among patients with type II diabetes mellitus.

The conceptual framework adopted for this study was based on modified Becker M model (1974).

Glucometer was used to check the blood glucose level in both the experimental and the control groups. Purposive sampling technique was used for sample selection. 60 samples were taken (30 in experimental group and 30 in control group) for this study based on the inclusion criteria. Method of data collection includes monitoring the pre- test blood glucose level using a glucometer. Then the experimental group was given fenugreek powder for 15 days. After 15 days, the post-test blood glucose level was checked for both experimental and control groups using the glucometer.

Based on the objectives and hypotheses the data were analyzed by using both descriptive and inferential statistical methods. Descriptive statistics were used for frequency and percentage, and for graphical representations such as bar and pie diagrams. Inferential statistics such as paired‘t’ test and chi-square were computed to test the hypothesis at 5% level of significance.

MAJOR FINDINGS OF THE STUDY

- With regard to age, 30% were between 41-50 and 51-60 years in the experimental group and 36.7% were between 41-59 years of age in the control group.
- With regard to sex, in the experimental group 56.7% were males and 66.7% were males in the control group.

- Regarding the religion, majority of the subjects were 36.7% were Muslims in the experimental group and 50% were Hindus in the control group.
- Regarding the marital status, majority of the samples 76.7% were married in both experimental and control groups.
- Regarding the educational status, majority of the subjects had completed higher secondary education 26.7% in the experimental group and 23.3% in the control group.
- Regarding the occupation, majority of the samples 33.3% were unemployed in the experimental group and 23.3% were coolies, government and private employee in the control group.
- Regarding the family income, majority of samples 33.3% were getting an income between Rs 4001-6000 in the experimental group and 40% of samples were getting above Rs 6000 in the control group.
- With regard to family history of diabetes mellitus, majority of the sample's parents were having the history of diabetes in (40%) experimental group and in (43.3%) control group.
- Regarding personal habits, 40% of samples were having none in the experimental group and 40% were alcoholic in the control group.
- Regarding the diet, majority of the subjects were taking mixed diet in the experimental group (60%) and in the control group (56.7%).

- Regarding the duration of treatment taken for diabetes mellitus, majority of them were between 4-6 years in the experimental group (50%) and in the control group (40%).
- With regard to following diabetic diet, 53.3% of samples said ‘no’ in the experimental group whereas 50% said ‘no’ in the control group.
- Regarding the habit of doing exercises, 53.3% of samples said ‘yes’ in the experimental group and 80% of samples said ‘no’ in the control group.
- The mean post-test level of blood glucose (146.66) was lower than the mean pre-test level of blood glucose (220.60) in the experimental group.
- There was an association between post-test blood glucose level of the experimental group and their selected demographic variables such as religion, following diabetic diet and habit of doing exercises. In the control group there was an association between post-test blood glucose level and their selected demographic variables such as religion, marital status, following diabetic diet and habit of doing exercises.

IMPLICATIONS

The findings of the present study supports that, fenugreek is very safe, cost effective and almost is not harmful to health. It is provided to be effective in non pharmacologic management to reduce blood glucose level. The findings of the study have several implications for the following fields.

Implications for Nursing Practice

- The findings of the study enlighten the fact that fenugreek therapy can be used to maintain the blood glucose of patients with type II diabetes mellitus.
- The study findings help the nursing personnel include fenugreek as a nursing intervention in the management of type II diabetes mellitus patients.
- Fenugreek can be administered to maintain blood glucose level of patients with diabetes mellitus.
- The nurse should contribute to the evidence based practice through the experience gained from the applications of fenugreek powder while caring patients with type II diabetes mellitus.

Implications for Nursing Education

- The study will enhance the nursing students to acquire knowledge about fenugreek and its uses in maintaining blood glucose level.
- The study will enhance the students to compare fenugreek with other therapies for reducing the blood glucose level.
- The effectiveness of fenugreek in reducing blood glucose is to be published in the nursing journals to make awareness among the nursing students.
- Nurse educators should supervise and encourage the nursing students to educate about fenugreek while caring a patient with type II diabetes mellitus.

- Education helps the individual to learn new things. This study results can be used as an informative illustration for the nursing students who can effectively use the fenugreek for its hypoglycemic effect.
- This study results can be used as an example by the nurse educator in the classrooms, when giving instructions regarding the care of patients with type II diabetes mellitus.
- Nurse educators can arrange in-service education programs for the nurses who are all working in the diabetic clinics and multi speciality hospitals to update their knowledge regarding the effect of fenugreek on type II diabetes mellitus.

Implications for Nursing Administration

- Nurses are challenged to play the role of efficient administrator as well as practitioner. To perform that role, apart from knowledge in administration, nurses also must have good knowledge to disseminate the research findings into practice, so that it will become beneficial to the clients.
- These findings will help the administrator to encourage the nurses to use fenugreek in maintaining blood glucose level.
- Charts and handouts regarding the uses of fenugreek in diabetes mellitus can be fixed and given to the people from the wards and OPD, so that it can motivate the patients to practice it.
- These findings will help the administrators to arrange a continuing education programme for nurses regarding fenugreek intake.

- Nurse administrators can create awareness among medical surgical nurses and enlighten their knowledge about the importance and effect of fenugreek on type II diabetes mellitus.

Implications for Nursing Research

- This study can be a baseline for future studies to build upon and motivate the investigators to conduct further studies.
- Nurse researcher should identify the constraints and barriers in practising intake of fenugreek powder and the ways to solve the problem by doing further research.
- The nurse researcher should publish her study results in the conferences, workshops or through other media thereby more studies can be conducted in this area in order to strengthen the role of nurse.
- Nurse researcher has to conduct the research by comparing the fenugreek with other complementary therapies.
- Nurse researcher has to identify the effects of fenugreek for other conditions such as hypertension and arthritis.
- Nurse researcher has to conduct the study regarding the effectiveness of fenugreek in type I diabetes mellitus.

RECOMMENDATIONS

- The study can be conducted by using large populations to generalize the findings.
- A longitudinal study can be conducted to assess the effectiveness of fenugreek in maintaining blood glucose level.

- ❖ This study can be done as a comparative study in different settings.
- ❖ The effectiveness of fenugreek can be tested among patients with diabetes mellitus who are on insulin administration.
- ❖ A follow up study can be done to find out whether the patients are practicing fenugreek intake regularly.

CONCLUSION

As for this research is concerned, the interventional study proved that there is a significant reduction of blood glucose level among patients with type II diabetes mellitus. The findings of the present study agree with the findings of the previous clinical study, regarding fenugreek powder. The pre-test and post-test mean and standard deviation were calculated. The paired ‘t’ test was applied to identify the effectiveness. The reduction of blood glucose level was statistically significant at 0.05 level. Therefore the fenugreek powder is a very effective non-pharmacological intervention to reduce the blood glucose level among type II diabetes mellitus patients.

REFERENCES

BOOKS

- Bears Myers (1998). ***"Adult Health Nursing",*** (3rd ed.), Philadelphia: Mosby Publishers, 1412-1422.
- Joyce M. Black & Jane Hokanson Hawks (2005). ***"Medical Surgical Nursing",*** (7th ed.), Philadelphia: WB. Saunders Company, 1257.
- Lewis, Hiet Kemper & Dirkson (2004). ***"Textbook of Medical Surgical Nursing",*** (5th ed.), Philadelphia: Mosby Publications, 1271.
- Luckman & Soronsen's (2001). ***"Medical Surgical Nursing" Psycho Physiologic Approach",*** (4th ed.), Philadelphia: WB. Saunders Company, 1775.
- Polit, D.F. & Hungler B.P. (2004). ***"Nursing Research Principles and Methods",*** (5th ed.), Philadelphia: J.B. Lippincott Company.
- Potter, A. Patrica, Perry Griffin Anne (2001). ***"Fundamentals of Nursing",*** (5th ed.), London: Mosby Publications, 91-92.
- Ross & Wilson (2002). ***"Textbook of Anatomy and Physiology in Health and Illness",*** (10th ed.), Philadelphia: Livingstone Company, 232.
- Suzanne C. Smeltzer & Brenda Bare (2004). ***"Textbook of Medical and Surgical Nursing",*** (10th ed.), Philadelphia: Lippincott Company, 1151-1154.

- Sundar Rao, P.S., Richard J., (1999). ***"An introduction to Biostatistics- A Manual for Students in Health Sciences",*** (3rd ed.), Philadelphia: Lippincott Company.

- Williams & Wilkins (2006). ***"Manual of Nursing Practice",*** (8th ed.), Philadelphia: Lippincott Company, 920.

JOURNALS

- Abdul Hamid Zargar, Nissar Ahmad Shah, Shariq Rashid Masoodi, Bashir Ahmad Laway, Farooq Ahmad Dar, Abdul Rashid Khan, Fayaz Ahmad Sofi & Arshad Lqbal Wani (2000). Copper, Zinc and Magnesium Levels in Non insulin dependent Diabetes Mellitus, ***Asian Journal of Diabetology,*** Apr. 2(3):43-45.

- Almdal. T Scharling, H. Jansen, H. VEstergard, H. (2008). Higher prevalence of risk factors for type II diabetes mellitus and subsequent higher incidence in men, Denmark: European ***Journal of Internal Medicine***, 19:40-45

- Andrea. A & Howard. (2004). Effects of Alcohol Consumption on Diabetes mellitus, ***Annuals of Internal Medicine***, 140(3): 211-217.

- Basch, E. et al., (2003). Therapeutic application of fenugreek, ***Alternative Medicine Review,*** 8(1): 20-27.

- Chen, H.S. et al., (2008). Effects on health education on glycemic control during holiday time in patients with type-2 Diabetes Mellitus, ***American Journal of Management Care*** 14(1): 45-57.

- Dam Van, M. (2002). Dietary patterns and risk for type-2 DM in U.S. Men, ***Annuals of Internal Medicine,*** 136(3): 201-209.
- Garg & Colleagues (2000). High Fiber Diet Associated with Improved Glycemic Control, ***"New England Journal of Medicine",*** Oct, 3(1): 61.
- Gupta & Arvind, (1998). Effect of hydroalcoholic extract of fenugreek seeds in management of NIDDM; A double blind study. ***JAPI***, 46:85
- Gupta, A. Gupta, R. & Lal. B. (2001). Effects of fenugreek seeds on glycemic control and insulin resistance in type-2 DM, a double blind placebo controlled study, ***Journal of Association of Physicians India***, 49(1): 57-61.
- G.Y. Yeh, D.M. Eisenderg, T.J. Kaptchuk, R.S. Phillips, (2003). Systematic review of herbs and dietary supplements for glycemic control in diabetes, ***Diabetic Care,*** 26(4): 1277-1294.
- G.Y. Yeh, D.M. Eisenberg, R.B. Davis & R.S. Phillips (2000). Use of complementary and alternative medicine among persons with DM, American Diabetes Association, Diabetes spectrum; 14: 199-200.
- Hans J Woele, Christoph Neumann, Silvia Zschau, Stephanie Tenner, Andrea Irsigler Joerg Schirra, John E.Gerich & Burkhard Goke (2007). "Impact of fasting and post prandial glycemia on overall glycemic control in type-2 diabetes, ***Diabetes Research and Clinical Practice,*** Aug. 77(2):280-285.
- Jean-Louis Chiasson, Robert G. Josse, Ramon Gomis, Markoif Hanefeld, Avraham Karasik & Markku Laakso (2002).

Acarbose for prevention of type-2 diabetes mellitus, ***The Lanset,*** Jun. 359(9323):2072-2076.

- Josie MM Evans, Jixian Wang & Andrew D. Morris (2002). Comparison of Cardiovascular Risk Between Patients With Type II Diabetes and those who had a Myocardial Infarction, ***"British Medical Journal"*** Jul. 324(20): 939-942.

- Kaviarasan, S.Vijiyalakshmi & K.Anuradha, (2006), Polyphenol-rich extract of fenugreek seeds protects erythrocytes from oxidative damage, ***Tamilnadu: Plant Food Human Nutrition***, 59 (4): 143-7.

- Lakhwinder Kaur (2006). Influence Of Complementary Therapies on Health, ***Indian Journal of Holistic Nursing,*** Dec. 2(3):12-13.

- Laura Shane, Mc.Whorter, (2001). Biological complimentary therapies: A focus on botanical products in diabetes, ***American Diabetes Association; Diabetes Spectrum***, 14: 199-200.

- Madar, Z. Abel, R.Samish, S. & Arad, J. (1998). Glucose lowering effect of fenugreek in non-insulin dependent diabetics, ***European Journal of Clinical Nutrition,*** 42:51-54.

- Maureen Shaun Kennedy (2007). Addressing Diabetes Self Management, ***American Journal of Nursing,*** May, 107(5).

- Niamath's(2006). The Amazing Fenugreek, ***Herbal Unani Med.,*** Apr, 8(3):8-10.

- Pathak, P.Srivatava, S.Grover, S. (2000). Development of food products based on mellitus, legumes and fenugreek seeds and

their suitability in the diabetic diet, Pant Nagar: ***Internal Journal of Food Sciences and Nutrition.*** 51 (5): 409-14.

- Puri, D.Prabhu, K.M.Muirthy, P.S. (2002). ***Indian Journal of Physiology Pharmacology;*** 46: 457-62.
- Raghuram, T.C. Sharma, R.D.Sivakumar, B.Sahay, B.K. (1994). Effects of fenugreek seeds on I.V.Glucose disposition in NIDDM patients. ***Phytotherapy Research,*** 8: 83-84.
- Ramesh Kumar, T.,Shoba, J.,Prasanna Kumar, K.M.,Sharad Pandsey, Siddarth N.Shan, Muralidhar S.Rao, Rao, P.V.,Sridhar, G.R., Chiranjeevi Reddy, Y., Mohan, V., Hydip Bhaduri & Aravinda Babu (2000). Evaluation of Efficacy and Safety Of Glidazide in NIDDM patients who failed to respond to Glibendamide Therapy, ***The Asian Journal Of Diabetology,*** 2(3): 17-20.
- Saraswathi, (1999). Methi, more than a spice, besides being a spice, methi is a wonderful medicine, Health Action.
- Saxena, A. & Vikram N.K. (2000). Role of selected Indian plants in management of type II diabetes a review. New Delhi: abhasaxena 2000 @ yahoo.com.
- Shanthi Johnson & Leah Macaden (2006). Pathophysiology and Management Of Patients with Type II Diabetes Mellitus, ***Indian Journal of Continuing Nursing Education***, Jan- Jun. 7(1).
- Sharma, R.D. Raghuram, T.C. & Sudhakar Rao, N. (1990). Effect of fenugreek seeds on blood glucose and serum lipids in Type I diabetes. ***European Journal of Clinical Nutrition*** 44: 301-304.

- Shekar Shak (1999). Exercise, Yoga, Games and Diabetes, ***Asian Journal of Diabetology***, Apr-Jun. 1(3):40-44.
- Siddarth N. Shah. (2000). Diabetes Millennium 2000, ***The Asian Journal of Diabetology***, 2:2.
- Sr.Usha, M.S.M.I. (1998). Methi as medicine, Fenugreek is more than a spice, besides being a spice, methi is a wonderful medicine, Health Action.
- Sorna Vira (1999). Fenugreek or methi lowers elevated LDL Cholesterol and triglyceride levels and increases HDL cholesterol, it also improves tissue sensitivity to insulin, thereby enhanching peripheral utilization of glucose, ***The Asian Journal of Diabetology.*** 1(3): 43.
- Suvarna Vira (1999). Fenugreek or Methi, Trigonella Foenum Graecum, ***Asian Journal of Diabetology***, Apr.-Jun. 1(3):53-54.
- Walker, K.Z. (1999). Regular walking useful in Type II Diabetic women, ***Asian Journal of Diabetology***, Jan. 2(2):50.
- WHO (2006). Prevalence of Diabetes World Wide, ***Indian Journal of continuing Nursing Education***, Jul. 7(2):32.
- Winton, J. Craig. (2007). Nature's efficient pharmacy, Herbs that help to maintain normal blood sugar. Herald of health.
- Zecharia Madar, et al., (1988). Glucose-lowering effect of fenugreek in NIDDM. ***European Journal of Clinical Nutrition***, 42(3): 53-54.

Websites

- http:// www.cdc.gov/nccd php/publications/aag/ddt.htm.
- http//www.nature.com/nature/journal/v414/n6865/abs/414782a.htm/.
- http//link/nghub.elsevier.com/retrieve/pil/So168822703000196.
- http//www.cdc.gov/mmwr/preview/mmwrhtm/mm5345a2.htm.
- fatpig@picknow/.com
- www.ispub.com
- www.intelihealth.com
- www.pubmed.com
- www.google.com
- www.wikepedia.com
- www.ask.com

APPENDIX-I

LETTER SEEKING EXPERTS OPINION FOR CONTENT VALIDITY TOOL

From

Miss L.Saritha
M.Sc. (Nursing) II year
Matha College of Nursing
Manamadurai.

To

Through the Principal

Respected Madam/ Sir,

Sub: Requesting opinion and suggestion of experts for content validity.

****

I am a final year master degree nursing student in Matha College of Nursing Manamadurai. In partial fulfilment of master degree in nursing, I have selected the topic mentioned below for the research project to be submitted to Dr. M.G.R. Medical University, Chennai.

PROBLEM STATEMENT:

"A study to determine the effectiveness of fenugreek powder on reducing blood glucose level among type II diabetic patients in a selected hospital, Madurai."

I request you to kindly validate the tool and give your opinion for necessary modification and also I would be very grateful if you could improve the problem statement and objectives.

Enclosures:

a. Statement of the problem
b. Objectives
c. Research hypotheses
d. Research methodology
e. Description of the tool
    i. Part I : Demographic variables
    ii. Part II : Glucometer

Thanking you in anticipation,

Place: Manamadurai,
Date:

Yours sincerely,

(L. SARITHA)

APPENDIX-II

LIST OF EXPERTS OPINION FOR CONTENT VALIDITY

1. **Dr. K. Sunder, M.S., Diab.**
   General Surgeon cum Diabetologist,
   Karunai Multi Speciality Hospital,
   Madurai.

2. **Mrs. Regina, M.Sc.(N), (Ph.D.)**
   Principal,
   Thandai Rover College of Nursing,
   Perambalur.

3. **Prof. Mrs. Devakirubai, M.Sc.(N), (Ph.D.),**
   Professor of Medical Surgical Nursing
   Sacred Heart College of nursing,
   Madurai.

4. **Mrs.Manjula, M.Sc. (N),**
   Lecturer in Medical Surgical Nursing,
   Sacred Heart College of nursing,
   Madurai.

5. **Prof.Mrs.Shabera Banu M.Sc.(N), (Ph.D.),**
   Principal ,
   Matha college of Nursing,
   Manamadurai.

6. **Prof.Mrs.Kalaikuruselvi M.Sc.(N), (Ph.D.),**
   Vice Principal,
   Matha college of Nursing,
   Manamadurai.

7. **Prof.Mrs.Thamaraiselvi M.Sc. (N), (Ph.D.)**
Vice Principal,
Matha College of Nursing,
Manamadurai.

8. **Prof.Mrs.Saraswathi, M.Sc.(N), (Ph.D.)**
Principal,
Ramachandra Naidu College of nursing
Sankarankoil,
Tirunelveli district.

9. **Prof.Mrs.Helen Rajamanickam M.Sc. (N),**
Professor
Matha college of Nursing,
Manamadurai.

APPENDIX-III

LETTER SEEKING PERMISSION TO CONDUCT STUDY AT KARUNAI MULTI SPECIALITY HOSPITAL, MADURAI

To

The Managing Director,
Karunai Multi Specialty Hospital,
B.B. Kulam,
Madurai.

Respected Sir/madam,

Sub: Requisition for giving permission to conduct the research in your esteemed organization.

****

I wish to state that **Miss L. Saritha**, one of our final year M.Sc. Nursing students, Matha College of Nursing, Manamadurai has to conduct a project, as the partial fulfillment of university requirements for the degree of Master of Science in Nursing.

The statement of the problem is:

"A STUDY TO DETERMINE THE EFFECTIVENESS OF FENUGREEK POWDER ON REDUCING BLOOD GLUCOSE LEVEL AMONG PATIENTS WITH TYPE II DIABETES MELLITUS IN A SELECTED HOSPITAL, MADURAI."

We request you to kindly permit her to do the research in your esteemed institution and give her valuable guidance and suggestions.

Thanking you,

Place: Manamadurai
Date:

Yours faithfully,

Prof. Mrs. Shabera Banu,
M.Sc (N), Ph.D.
Principal

APPENDIX-IV (A)

PART-A

Demographic Variables

1. Age (in years)

a) 30-40

b) 41-50

c) 51-60

d) Above 60

2. Sex

a) Male

b) Female

3. Religion

a) Hindu

b) Christian

c) Muslim

d) Others

4. Marital Status

a) Married

b) Unmarried

c) Widowed

d) Divorced

5. Educational Status

a) Illiterate

b) Primary education

c) Higher secondary education

d) Diploma

e) Degree

f) Postgraduate

6. Occupation

a) Unemployed
b) Coolie
c) Government employee
d) Private employee
e) Self-employee

7. Family Income (Rs.)

a) Below 2000
b) 2000-4000
c) 4001-6000
d) Above 6000

8. Family History of Diabetes

a) Parents
b) Siblings
c) None

9. Personal Habits

a) Alcoholic
b) Tobacco & betel leaves chewing
c) Drugs
d) Smoking
e) None

10. Diet

a) Vegetarian
b) Non-vegetarian
c) Mixed

11. Duration of Treatment Taken (Years)

a) 1-3

b) 4-6

c) 7-9

d) More than 9

12. Following Diabetic Diet

a) Yes

b) No

13. Habit of Doing Exercises

a) Yes

b) No

PART-B

Glucometer

GLUCOMETER

A **glucose meter** (or **glucometer**) is a medical device for determining the approximate concentration of glucose in the blood. A small drop of blood, obtained by pricking the skin with a lancet, is placed on a disposable test strip that the meter reads and uses to calculate the blood glucose level. The meter then displays the level in mg/dl or mmol/l.

CHARACTERISTICS

Size: The average size is now approximately the size of the palm of the hand, though some are smaller or larger. They are battery-powered.

Test Strips

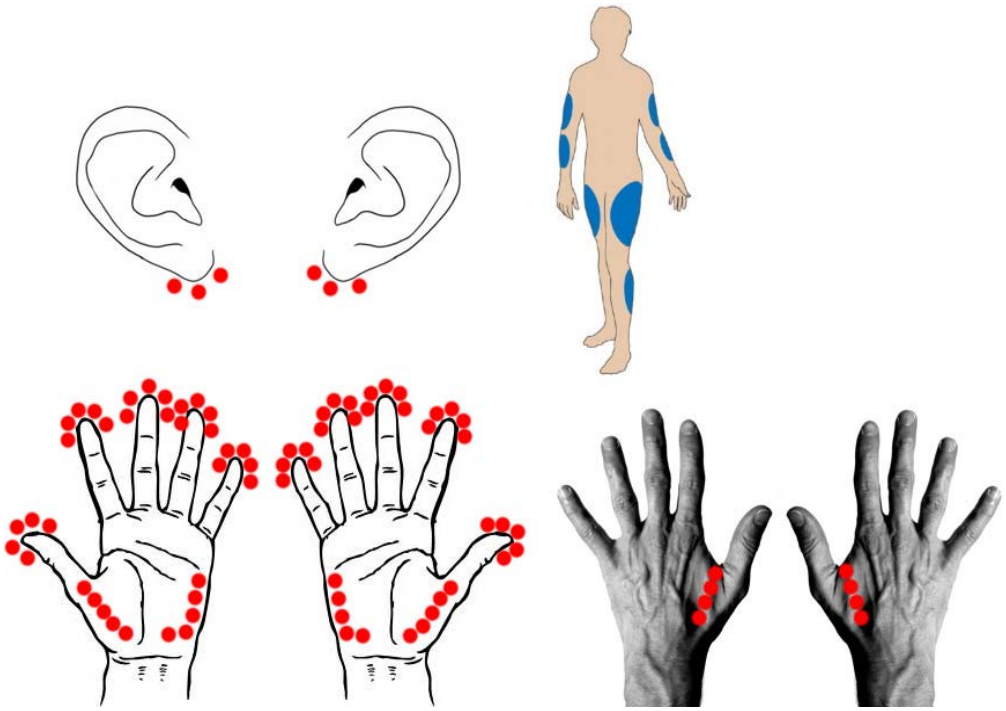
Test strips: A consumable element containing chemicals that react with glucose in the drop of blood is used for each measurement.

Coding: By entering the coding or chip into the glucose meter, the meter will be calibrated to that batch of test strips.

Volume of Blood sample

Volume of blood sample: The size of the drop of blood needed by different models varies from 0.3 to 1 µl.

Alternative site testing: Smaller drop volumes have enabled "alternate site testing" — pricking the fore arms or other less sensitive areas instead of the fingertips. Although less uncomfortable, readings obtained from fore arm blood lag behind fingertip blood in reflecting rapidly changing glucose levels in the rest of the body.



Testing time: The time it takes to read a test strip may range from 3 to 60 seconds for different models.

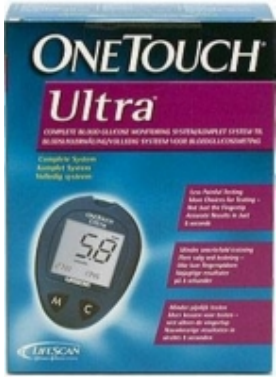
Display: The glucose value in mg/dl or mmol/l is displayed in a small window. In U.S., France, Japan, Israel, and India the preferred unit is mg/dl. The unit mmol/l are used in Canada, Australia, China and the UK. Germany is the only country where medical professionals routinely operate in both units of measure. (To convert mmol/l to mg/dl, multiply by 18. To convert mg/dl to mmol/l, divide by 18.)

ACCURACY

Blood glucose meters must meet accuracy standards set by the International Organization for standardization (ISO). According to ISO 15197 Blood glucose meters must provide results that are within 20% of a laboratory standard 95% of the time (for concentrations about 75 mg/dL, absolute levels are used for lower concentrations).

Factors affecting accuracy of various meters include calibration of meter, ambient temperature, pressure used to wipe off strip, size and quality of blood sample, high levels of certain substances (such as ascorbic acid) in blood, hematocrit, dirt on meter, humidity, and aging of test strips.

ONE TOUCH ULTRA



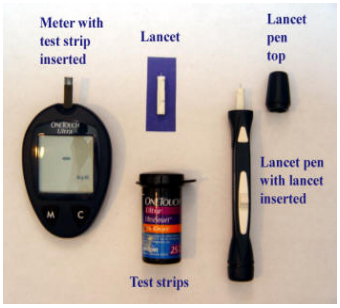
One Touch Ultra is a blood glucose monitoring device for people with diabetes and is the foundation product for LifeScan's OneTouch Ultra Family of blood glucose monitoring systems. OneTouch Ultra Blood Glucose Meters provide blood glucose test results in 5 seconds. The results are displayed as plasma values.

One Touch Ultra Glucometer contents:

- Adjustable Blood Sampler
- 10 Sterile One Touch Ultra Soft Lancets
- Carrying Case
- Owners Booklet
- Quick Reference Guide
- 3.0V Lithium Battery
- One Touch Ultra Clear Cap For Testing on the Arm

Carry Case

Glucometer Contents



Simple 3-Step Testing

1. Turn On the One Touch Ultra Glucometer by Inserting Test Strip
2. Apply Sample to the One Touch Ultra Strip
3. Accurate Result in Just 5 Seconds.

Smaller Blood Sample

- Exclusive FastDraw design test strip requires just a tiny drop of blood
- Automatically pulls blood into test strip

Less Blood Means Less Pain

- Test on arms where fewer nerve endings are present
- UltraSoft lancets with a thin tip for less painful penetration
- UltraSoft sampler adjusts to individual needs to reduce pain

Advanced Data Management

- Large, easy-to-read display
- 150 test memory with data and time

Measures in mg/dl

- Meters show their readings only in mg/dl, making it safer to use.

APPENDIX-IV (B)

பகுதி-அ

பொது விவரங்கள்

1). **தகவலரின் வயது வரம்பு (வருடங்களில்)**

அ). 30 - 40
ஆ). 41 - 50
இ). 51 - 60
ஈ). 60 - க்கு மேல்

2). **பாலினம்**

அ). ஆண்
ஆ). பெண்

3). **மதம்**

அ). இந்து
ஆ). கிறிஸ்டியன்
இ). முஸ்லிம்
ஈ). வேறு

4). **மணமான தகுதிநிலை**

அ). மணமானவர்
ஆ). மணமாகாதவர்
இ). துணை இழந்தவர்
ஈ). விவாகரத்து பெற்றவர்

5). **கல்வித்தகுதி**

அ). கல்லாதவர்
ஆ). ஆரம்பநிலைப்பள்ளி
இ). மேல்நிலைப்பள்ளி
ஈ). பட்டயப்படிப்பு
உ). இளநிலை பட்டம்
ஊ). முதுகலை பட்டம்

6). தொழில்நிலை

அ). வேலையில்லாதவர்
ஆ). கூலி
இ). அரசாங்க ஊழியர்
ஈ). தனியார் வேலை புரிவோர்
உ). சுய தொழில் புரிவோர்

7). மாத வருமானம் (ரூபாய்)

அ). 2000த்துக்கு கீழ்
ஆ). 2000 - 4000
இ). 4001 - 6000
ஈ). 6000த்துக்கு மேல்

8). நீரிழிவு நோய் பற்றிய குடும்ப விவரம்

அ). பெற்றோர்கள்
ஆ). உடன்பிறந்தோர்
இ). ஏதுமில்லை

9). தனி நபர் பழக்கவழக்கங்கள்

அ). மது அருந்துதல்
ஆ). புகையிலை மற்றும் வெற்றிலை உபயோகித்தல்
இ). மயக்கப்பொருட்கள்
ஈ). புகைபிடித்தல்
உ). ஏதுமில்லை

10). உணவுமுறை

அ). சைவம்
ஆ). அசைவம்
இ). கலப்பு உணவு முறை

11). நோய்க்கான காலவரை (வருடங்களில்)

அ). 1 - 3
ஆ). 4 - 6
இ). 7 - 9
ஈ). 9துக்கு மேல்

12). நீரிழிவு நோய்க்கான உணவு முறையை பின்பற்றுதல்

அ). ஆம்
ஆ). இல்லை

13). உடற்பயிற்சி செய்யும் பழக்கம்

அ). ஆம்
ஆ). இல்லை

பகுதி-ஆ

f;Snfhk‰P;lh;

FSfnfh!; k‰P;lh; (myyJ f;Snfhk‰P;lh) ,uj;jj;jpy; FSfnfh!pd; njhuha msit j‰Pkhdpggjw;fhd xU kUj;Jt rhjdk; MFk/ njhypy; Fj;Jtjw;F ,yf;Fthd Crpapd; Kyk; bgwggl;l rpW Jspa ,uj;jj;ij nrhjid

!;lhpgg[y; itj;jhy; mjpy; cs;s FSfnfh!pd; msit k‰P;lh; fzf;fpl;L bjhpaggLj;Jk/ mij k‰P;lh; **mg/dl** myyJ **mmol/l** vdw kjpgg[y; fhl;Lk/

rpwggpayg[fs;

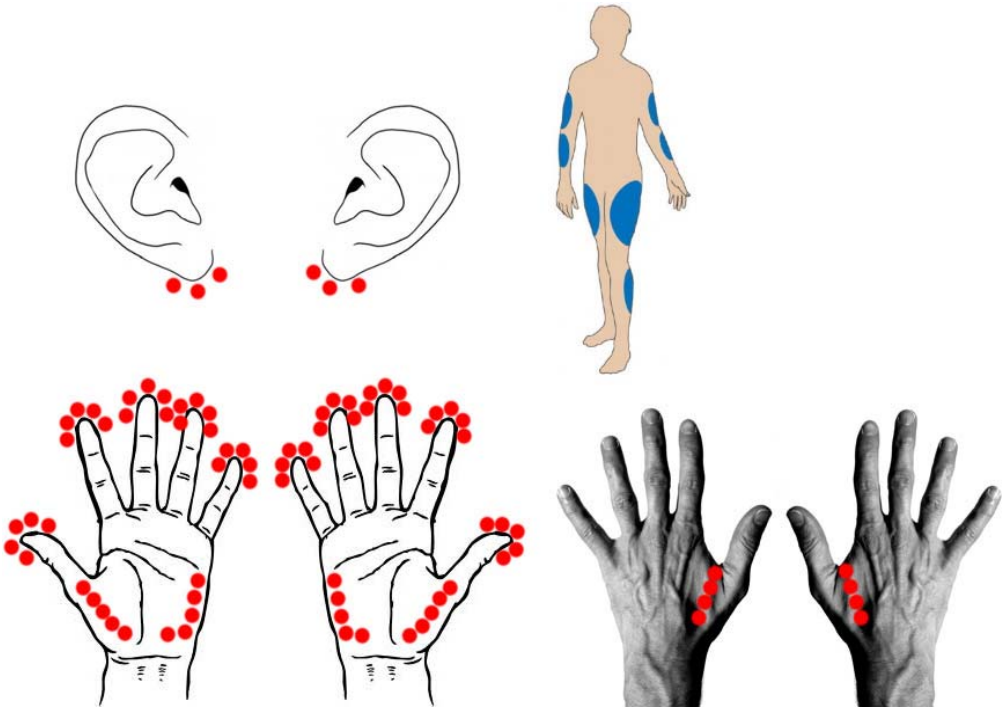
mst[? ,gnghJ f;Snfhk‰P;lh;fs; ruhrhpahf cs;s';if mst[cs;sJ/ mit ngl;lhp Mwpwypy;braygLfpdwJ/

bl!;l;gl;ilfs;? ,uj;j Jspapy; cs;s FSfnfh!; ,urhad';fis bfhz;l jdpkj;Jld; tpidg[pe;J ,uj;j FSfnfh!pd; msit[j‰Pkhdpf;fpdwJ/

Fwpa‰P? FSfnfh!;k‰P;lhpy; Fwpa‰P;il gjpggjd; Kykhfnth myyJ rpg;ig bghUj;Jtjd; Kykhfnth me;j k‰P;lh;nrhjid gl;ilfspd;bjhFjp msit[f;F jpUj;jggLfpwJ/

,uj;j mst[? btt ntW kP;lh;fs y; njitggLk; ,uj;j Js ad; mst[0/3 Kjy;1 L tiu khWgLk/

khwW jsj;j y; nrhjid ? r W Js ,uj;jnk bghJkhdjhy; cly d; khwW gFj fs Yk; nrhjid braayhk/ (KH';if myyJ Fiwthd czh;j wd; bfhz;l gFj /) tuy; Ed a y Ue;J bgwggl;l ,uj;j Js ad; FSfnfh!;mst[kww cly; gFj a y; ,Ue;J bgwggl;l ,uj;j Js ad; FSfnfh!; msit t l Jyy akhdJ/



nrhjid neuk; ? xU nrhjid !;lh g;ig gogg jw;F vLf;fggLk;neuk;3 Kjy;60 behofs;MFk/

ms i t fhzgpj;jy;? FSfnfh!; mg/dl my;y J mmol/1 kjpggpy; fhl;lggLk/ mbkhpf;fh. gpuhd;!; $gghd; ,!;nuy; kwWk; ,e;jpahtpy; mg/dl vdw kjpgg[gadgLj;jggLfpdwd/ b$hkdpapy; kl;Lk; ,uz;L kjpgg[fSk; cgnahfpf;fggLfpwJ/ (mmdl/L hpypUe;J mg/dL Mf khwpw mij 18 My; bgUf;fntz;Lk/ mg/dl ypy; ,Ue;J mmol/l Mf khwpw mij 18 My;tFf;fntz;Lk).

Jy;ypak;

,uj;j FSfnfh!; kP;lh; rh;tnjr juepah;za mikgg[(lv!;X) mikj;j Jy;ypa juj;ij milantz;Lk/ lv!;X 15197 juj;jpdgo FSfnfh!; kP;lh; 95 rjtpfpj neuk; 20 rjtpfpj Ma;tf juepiyf;Fs;kjpg;ig juntz;Lk/

kP;lhpd; mst[j;jpUj;jk; Rwwggpw btggepiy. !;lhpg; Jilf;f gadgLk;mGj;jk; mst[kwWk; ,uj;j Jspapd;juk; ,uj;jj;jpy; m!;fhhgpf; mkpyk; mjpf mst[,UggJ. btwknlhfphpl; kP;lhpd; kPJ ss;s J}rp. <uggjk; kwWk; nrhjid gl;ilapd; ehlgly; Mfpait kP;lhpd; Jy;ypaj;ij ghjpf;Fk; fhuzpfs;MFk/

xd;lr;my;lpuh

xd;lr;my;lh vdgJ eP H t[neha;
cs;sthf;fs d; ,ujj FSfnfhi !
fz;fhzf;f iyg; !nfd; xd; lr;
my;lh eWtdj;jdhy; jahhf;fggl;l
xU rhjdk; MFk/ ,f;fUt ,ujj
FSfnfh!d; msit 5 behofs;y;
bjhaggLj;Jk/ Kot[fs;gsh!;khtd;
kjggy;fhl;lggLfwJ/

xd;lr;my;lh FSfnfhkP;lhd;cs;slf;f';fs;

- ,ujj;ijvLf;fgadgLj;jggLk;fUt
- 10 xd;lr;my;lh bkdbghUs;yhzbrj;!;
- nky;ciu
- chikahsh;fs;g[fbyl;
- tiut[Fwgg[ifnaL
- 3/0 vyjak;nglhl;lh
- KH';ifay;nrhjidal xd;lr;my;lh f;sah;Fgg

nky;ciu FSfnfhkP;lhd;cs;slf;f';fs;

njid

1/ bl!;l;!phg;csbrYj;Jtjd;K;

FSfnfhkPlh;,a';Fk/

2/ ,uj;j Jsp iaxd;lr;my;lh !phpggpy;,lntz;Lk;

3/ le;J behoapy;Jy;ypakhd Kot[fpilj;Jtpl k/

rpW Jsp ,uj;jk;

- gpuj;jpnahf gh!;lhpuh totk; bfhz;l !phpgg[fspy; rpW Jsp ,uj;jk;nghJkhdJ/
- nrhjid !;lhpg;,uj;jj;ij jhdhfnt csstpGf;fpdwJ/

Fiwe;j ,uj;jk;vLggjhy;typ Fiwthf ,Uf;Fk;

- Fiwthd eukg[Ezpfs;bfhz;l if gFjpapy;nrhjid braypayhk;
- bkypypa Kid bfhz;l yhzpbrj;!; vdgjhy; typ Fiwthf ,Uf;Fk;
- my;lhpuh rhg;l; fUtp jdp egUfnfwg braygl;L typia Fiwf;Fk;

nkkgl;l jut[nkyhz;ik

- Rygkhf gof;f bghpa jpiu
- 150 nrhjidfspd;njjpiaak[k;neuj;ijak[k;gjpt[braypak[k;

Mg/dl ypy;kl;Lk;kjpgg[

- kPlhpy; xnu xU kjpgg[mjhtJ mg/dl epiyahf bghUj;jpajhy;cgnahfpggjw;F ghJfhgghdjhFk/

APPENDIX –V (A)

MEDICINAL USES OF FENUGREEK

Fenugreek (***Trigonella foenum-graecum***) is a plant in the family of Fabaceae. Fenugreek is used both as a herb (the leaves) and as a spice (the seed). The leaves and sprouts are also eaten as vegetables.

Fenugreek Plant

The plant is cultivated worldwide as a semi-arid crop and is a common ingredient in many curries.

Fenugreek Sprouts

Fenugreek Leaves

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Cuisine

The cuboid yellow to amber coloured fenugreek seeds are frequently used in the preparation of pickles, curry powders and curry paste, and the spice is often encountered in the cuisine of the Indian sub-continent.

Lactation

Fenugreek seeds are thought to be a galactagogue that is often used to increase milk supply in lactating women.

Medicinal

Fenugreek Tea

Arthritis has a low incidence rate in India, where a lot of fenugreek is consumed. Drinking 1 cup of fenugreek tea per day, made from the leaves, is said to relieve the discomfort of arthritis.

Fenugreek seeds are a rich source of the polysaccharide galactomannan. They are also a source of saponins such as diosgenin, yamogenin, gitogenin, tigogenin, and neotigogens. Other bioactive constituents of fenugreek include mucilage, volatile oils and alkaloids such as choline and trigonelline.

Fenugreek Seeds

Fenugreek seeds are used as a medicinal in Traditional Chinese

Medicine under the name Hu Lu Ba, where they are considered to warm and tonify kidneys, disperse cold and alleviate pain. Main indications are hernia, pain in the groin. They are used as raw or toasted. In India about 2-3g of raw fenugreek seeds are swallowed early in the morning with warm water, before brushing the teeth and before drinking tea or coffee, where they are supposed to have a therapeutic and healing effect on joint pains, without any side effects.

Fenugreek is frequently used in the production of flavoring for artificial maple syrups. The taste of toasted fenugreek, like cumin, is additionally based on substituted pyrazines. By itself, fenugreek has a bitter taste.

Maple Syrup

Fenugreek in Capsule Form

Fenugreek seed is widely used as a galactagogue (milk producing agent) by nursing mothers to increase breast milk supply.

Studies have shown that fenugreek is a potent stimulator of breast milk production and its use was associated with increases in milk production. It can be found in capsule form in many health food stores.

Several human intervention trials demonstrated that the antidiabetic effects of fenugreek seeds ameliorate most metabolic symptoms associated with type-1 and type-2 diabetes in humans by reducing serum glucose and improving glucose tolerance. Fenugreek is currently available commercially in encapsulated forms and is being prescribed as dietary supplements for the control of hypercholesterolemia and diabetes by practitioners of complementary and alternative medicine. Fenugreek contains high dietary fiber, so a few seeds taken with warm water before going to sleep help avoiding constipation.

APPENDIX –V (B)

வெந்தயத்தின் மருத்துவ குணங்கள்

வெந்தயம் பாபசியே குடும்பத்தைச் சேர்ந்த ஒரு தாவரம் ஆகும். வெந்தயத்தின் இலைகள் மூலிகையாகவும் மற்றும் அதன் விதைகள் மசாலாவாகவும் பயன்படுத்தப்படுகிறது. இலைகள் மற்றும் முளைகள் காய்கறிகளாக உண்ணப்படுகின்றன.

வெந்தய தாவரம்

இந்த தாவரம் உலகளவில் அரை வறண்ட பயிராக பயரிடப்படுகிறது மற்றும் பலவகை குழம்புகளில் இது பொதுவான உட்பொருளாக பயன்படுத்தப்படுகிறது.

முளைக்கட்டிய வெந்தயம்

வெந்தயக் கீரை

மஞ்சள் முதல் அம்பர் வரை வண்ணமுள்ள கனசதுர வெந்தயம் ஊறுகாய், கறி மசாலா மற்றும் கறி பேஸ்டு தயாரிப்புகளில் பயன்படுத்தப்படுகின்றன. இந்த மசாலா பெரும்பாலும் இந்திய துணைக்கண்டத்தின் உணவில் பயன்படுத்தப்படுகிறது.

பால் சுரப்பு

வெந்தயம் பெரும்பாலும் காலக்டோகோக்காக அதாவது பாலூட்டும் பெண்களின் பால் உற்பத்தியை அதிகரிக்க பயன்படுத்தப்படுகிறது.

வெந்தய தேநீர்

மருத்துவம்

வெந்தயம் நிறைய உட்கொள்ளப்படுவதால் இந்தியாவில் கீழ்வாதத்தின் நிகழ்வு வீதம் குறைவாக உள்ளது. இலைகளிலிருந்து தயாரிக்கப்படுகின்ற வெந்தய தேநீரை ஒரு நாளைக்கு ஒரு கப் என்ற விகிதத்தில் அருந்தி வந்தால் வாதத்தின் கோளாறுகள் நீங்குவதாக கூறப்படுகிறது.

விதைகள்

வெந்தயம் பாலிசாக்கரைட் காலக்டோமனன் என்ற மாவுச்சத்தை அதிக அளவு கொண்டுள்ளது. இதுபோன்று டையோஸ்கினின், யாமோஜினின், சிடோசினின், டைகோசினின் மற்றும் நியோடிகோசன் என்ற சாபோன்களையும் கொண்டுள்ளது. வெந்தயம் பிசின், ஆவியாகக்கூடிய எண்ணெய், கோலைன் மற்றும் ட்ரைகோனில்லைன் போன்ற

ஆலகலாய்டுகளையும் உட்பொள்களாக கொண்டுள்ளது.

வெந்தயம் பாரம்பரியமான சீன மருத்துவத்தின் கீழ் ஹூ பா லு என்ற மருத்துவ பெயரோடு பயன்படுத்தப்படுகின்றன. அவை வெப்பமளிக்கவும், சிறுநீரகத்தை பதப்படுத்தவும் குளிரை போக்கவும் மற்றும் வலியை அகற்றவும் பயன்படுகிறது. கவட்டையில் குடலிறக்கம் மற்றும் வலியை போக்க பயன்படுத்தப்படுகிறது. அவை பச்சையாகவோ, வறுக்கப்போட்டோ பயன்படுத்தப்படுகின்றன. இந்தியாவில் சுமார் 2-3 கிராம் வெந்தயத்தை பச்சையாக டீ அல்லது காபி குடிப்பதற்கும் முன்பாக நிதமான வெப்பநீரோடு சேர்த்து விழுங்கப்பட்டு வருகிறது. அவை எந்தவித பக்க விளைவுகளும் இல்லாமல் மூட்டு வலியை குணப்படுத்தும் தன்மையுடையது. வெந்தயம் செயற்கை மேப்பிள் தேன்பாகு உற்பத்தியில் சுவையூட்ட பெரும்பாலும் பயன்படுத்தப்படுகின்றன. வறுக்கப்பட்ட வெந்தயத்தில் பைரசின்ஸ் கூடுவதால் சீரகம் போன்ற சுவை காணப்படுகிறது. பொதுவாக வெந்தயம் கசப்புத்தன்மை கொண்டது.

மேப்பிள் தேன்பாகு

வெந்தய மாத்திரை

வெந்தயம் பாலூட்டும் தாய்மார்களுக்கு போதுமான மார்பக பால் உற்பத்தியை அதிகரிக்க ஒரு காலக்டோகோக்காக (பால் உற்பத்திக்கு உதவும்) பயன்படுத்தப்படுகிறது. வெந்தயம் மார்பக பால் உற்பத்தியை தூண்டி, பால் உற்பத்தியை அதிகரிக்கும் என்று பல ஆய்வுகள் மூலம் தெரிய வந்துள்ளது. இது பல சுகாதார உணவு கடைகளில் காப்ஸ்யூல் வடிவில் கிடைக்கிறது.

வெந்தயத்தில் உள்ள நீரிழிவு எதிர்ப்பு விளைவுகள் சீரம் குளுக்கோலை குறைத்து குளுக்கோஸ் ஏற்பை முன்னேற்றுவதன் மூலம் மனிதர்களில் வகை 1 மற்றும் வகை 2 நீரிழிவு தொடர்புடைய வளர்சிதை அறிகுறிகளை சீராக்கும் என்று பல மனித தலையீடு பரிசோதனைகளின் மூலம் தெரியவந்துள்ளது. வெந்தயம் தற்போது வணிக ரீதியாக மாத்திரை வடிவங்களில் கிடைக்கிறது. ஹைப்பர்கொலஸ்ட்ரால்மியா நீரிழிவு போன்றவற்றை கட்டுப்படுத்த கூடுதலான உணவு முறையான வெந்தயத்தை உட்கொள்ளலாம் என்று மாற்று மருத்துவ பயிற்சியாளர்களால் பரிந்துரைக்கப்பட்டு வருகிறது. வெந்தயத்தில் நார்சத்து அதிக அளவு உள்ளதால் தூங்குவதற்கு முன் நிதமான வெப்பநீரோடு சேர்த்து உட்கொண்டு வந்தால் மலச்சிக்கலை தவிர்க்கலாம்.